

N. A. Wood

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VOLUME XXXII

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RECESSION IN WEIGHT OF NESTLING BIRDS

By J. M. EDSON

In the course of some observations on the nesting of the Northern Violet-green Swallow in the summer of 1928, I noted a circumstance that was quite new to me. It was discovered that the nestling birds when about fourteen or fifteen days old, and before the feathers had broken from their sheaths, had attained a weight much greater than that of an adult of their species, and that from that time on there was a great shrinkage before the young birds were ready for flight. Although a reader of ornithological literature for many years, I could not recall having seen any reference to phenomena of this kind. Since making these observations, however, two other writers have mentioned a diminution in weight of young birds of certain other species. The subject appealed to me for further investigation, not only with reference to the swallows, but as to other species as far as practicable. With the season of 1929 my opportunities were far from what had been hoped for; but the following named species to some extent at least came under observation: Northern Violet-green Swallow (*Tachycineta thalassina lepida*), Western House Wren (*Troglodytes aëdon parkmanii*), Yellow Warbler (*Dendroica aestiva*, subsp.?), and English Sparrow (*Passer domesticus*). Only in the cases of the swallows and wrens, however, were the investigations materially successful.

Northern Violet-green Swallow.—The swallows observed were domiciled in a nesting box beneath the cornice at the end of a sleeping porch. The wrens occupied a similar box beneath the cornice at the side of the porch. I myself occupied the porch during sundry hours of the night and day. Prior to the series of observations to be discussed, both the swallows and wrens had made abortive attempts at nesting in other locations on the premises. The shadow of tragedy seemed to enfold the earlier reproductive projects of all the species referred to. Verily the rearing of the young is a process fraught with abundant peril.

When the swallows came to the box at the porch it was because their first clutch of eggs at the garage had been destroyed, by wrens or English Sparrows no doubt. This box contained the ready-made nest of the aforesaid sparrows of evil memory, now happily deceased, who had formerly driven away these rightful swallow claimants of the box and had hatched but failed to rear a brood of young of their own therein. On taking possession once more the swallows did not trouble to remove the coarse nest of twigs and grass left by the sparrows but merely added a liberal quantity of hen's feathers to the structure. During the laying period both swallows hovered about the nest much of the time, quite devoted to their project.

On June 30 there were three eggs in the nest. Incubation proceeded for the requisite twelve days in the usual manner of the species. That is to say, after the first few days the birds were away from the nest nearly all day for almost the

entire period. On the ninth day of incubation it was noted that it was as late as 8:33 p. m. that an old bird retired to the nest. The warm, feather-lined cradle in a snug box doubtless retained the proper temperature for incubation throughout the day. Early in the nesting period some vagrant English Sparrows put in an appearance, quite to the annoyance of the swallows. On investigating to see if the nest had been disturbed I found a swallow on it, and sitting so tightly that she would not move at the touch of my fingers even though I pinched her a bit. With the sparrows finally gone, the swallow came off, and neither of them was found again on the nest till hatching took place.

On both July 11 and 12, I found a bird on the nest, and she refused to let me look beneath her. I did not wish to use violence and it was not until the 13th that I saw the little birds, which then appeared to be about two days old. The three weighed eight grams. At three days old their combined weight was 12 grams; at five days it was 21 grams; seven days, 32; ten days, 50; seventeen days, 62; twenty days, 59; twenty-two days, 54; twenty-five days, 50. On the twenty-sixth day one of the young birds had left the nest. The average weight of the remaining two was $15\frac{3}{4}$ grams. At no time did the young birds differ in weight more than a fraction of a gram. On the twenty-seventh day, August 7 at 7 p. m., the nest was empty, although the birds had been seen there as late as 3 p. m. Weights for that day were not procured. July 21, one of the old birds was captured and found to weigh 16 grams. Absence from home on the sixteenth day regrettably precluded my securing the weights at that interesting date. The maximum weights recorded were taken when the young birds were seventeen days old and when their average weight was $20\frac{2}{3}$ grams. Thus it is to be seen that without having the weight for their last day in the nest the young birds lost during the last nine days an average of almost five grams; also that at their maximum they were individually 29 per cent heavier than the parent bird. The accompanying tabulation shows that the daily increase or decrease of weight was not altogether uniform. Variability in the content of the alimentary canal will perhaps explain that satisfactorily.

By the time the young birds had their eyes fully open, at the age of ten days, they were as heavy as their parents. Gray pinfeathers now concealed in major part the pinkish skin. Not till five days later did the remiges and rectrices break from their sheaths. The body, particularly the abdomen, was large in comparison with the limbs. During the reducing period the abdominal prominence steadily diminished till at the last it was almost a concavity.

After the little birds were hatched the parents showed great activity in supplying them with food, visiting the nest many times in the course of an hour. When the maximum of growth had been reached there was a diminution of parental activity. In fact, during the latter days there were hours together when the parents did not visit the nest, and evidently the food supply had been largely if not wholly cut off. The reduction period was one of notable feather development.

VARIAION IN THE WEIGHT OF YOUNG SWALLOWS

Days old	Grams	Days old	Grams
2	$2\frac{3}{4}$	17	$20\frac{2}{3}$
3	4	18	$20\frac{1}{3}$
5	7	19	20
7	$10\frac{1}{3}$	20	$19\frac{2}{3}$
8	$13\frac{1}{3}$	21	$19\frac{1}{3}$
10	$16\frac{1}{3}$	23	17
11	$16\frac{1}{3}$	24	$17\frac{1}{3}$
12	$18\frac{1}{3}$	25	$16\frac{2}{3}$
13	$19\frac{2}{3}$	26	$15\frac{3}{4}$
14	$19\frac{2}{3}$		

The 1928 Record.—As before stated, the swallows had nested in the same location in 1928. June 23, one young bird was found to have hatched, and the following day there were four. The development of the one bird all along was markedly in advance of that of the others, and evidently it must have been at least two and possibly three days older than they. This fledgling weighed 22 grams when about sixteen days old. Its excess in size at that time was what suggested weighing the birds. This bird had already demonstrated the dexterity of its wings, but it remained in the nest till 5 p. m. July 16, when it fared forth to see the world. When the younger three were 18 days old weights of all were taken as follows: 17, 17, 17 and 18 grams; at 20 days, 15, 15, 15 and 16 grams; at 22 days, the average weight of the three remaining ones was 14 1/3 grams. At the age of 23 days, July 17, these also departed from the nest, and the family was seen no more that season.

Western House Wren.—A Western House Wren appeared in our dooryard May 6, 1929. It was presumed to be one of the birds that had nested there the year before. It lingered about for several days and then disappeared, to reappear May 29; or at least it was presumed to be the same bird seen earlier. With it came a mate, and together they at once proceeded with construction of a nest in the box provided for that purpose under the cornice of the garage. They worked with speed and were not particular as to the interior finish of their structure, omitting any lining softer than a section of snake skin and some coarse grass. June 4, there were four eggs in the nest. On the 8th there were six eggs and incubation had commenced. Also a few feathers had lately been brought in.

On June 9 there were unexpected happenings. A fierce battle between two wrens near the nest was witnessed. Later there was another engagement; and still the war was not over. In the twilight that evening I discovered what appeared to be a wren's egg on the chopping block of the shed near by. Next morning the supposition was verified, and several small holes were observed in the shell. Investigation showed the nest to be empty.

Soon after this event I transferred the abandoned nest box to the cornice of the sleeping porch, where it was promptly visited by the wrens. Still the triangular mix-up appeared to continue. June 19, two rival wrens were about, singing with vigor and fighting with vim. Once a wren sat on a geranium stalk at the porch and sang as rapidly as he could catch his breath for nearly three minutes, all the while excitedly fluttering his wings. At the same time another wren sat facing him not fifteen inches away, also fluttering his wings and continuously scolding in a guttural tone.

A few days later peace regained its sway, and only two birds remained to occupy the nest. June 28, the nest was found to contain four eggs. The following afternoon there were six, and a bird was on the nest. Not till July 6 was the nest again examined, when somewhat to my surprise eight eggs were discovered in the nest. At six in the afternoon of July 12 one egg had hatched. Three hours later there were two little birds. Next morning at eight there were three, at four in the afternoon there were four, and at seven, five babies. Placed on the scales the group weighed seven grams. July 14, there were six little wrens, and their combined weight was 12 grams. July 16, there was a further enlargement of the family, bringing the number of juveniles to seven (the eighth egg never did hatch), with an aggregate weight of 27 grams.

Providing food for this brood necessitated great activity on the part of the parents. The day's labors began as early as 4:15 a. m. according to one morning's observation. One feeding per minute was the average for a considerable period of

watching. Occasionally there were intermissions. The female (presumably) when at or near the nest would not allow her mate to enter the box, but would flutter to him with drooping wings and significant sputterings to take his offering and carry it to the babes herself. Both parents were diligent workers, the female possibly a bit the more so.

As previously stated, the first egg hatched July 12, and the seventh on the 16th; thus there was a range of four days in the ages of the individual youngsters. Yet this difference was not conspicuous in their size or appearance, and they finally left the nest practically all at the same time, and at the average age of sixteen days. When about nine days old their eyes gradually opened. Soon they were energetically protesting against being handled, and were very nervous and quick, unlike the swallows. At fourteen days they broke away as they were being weighed, and fluttered about in all directions. The following day their nest box might have been the chest of Pandora if rapid "scatteration" when the lid was lifted were the determining factor. Indeed, one little one could not be recaptured. At this time their feathers were well developed, although the primaries and particularly the tail were noticeably shorter than those of adults. Very early in the morning of July 30 all but one left the nest, and it did so at 6:15 a. m.

The maximum weight of the brood, 75 grams, was reached at the average age of ten days. Had all been of the same age the maximum would theoretically have gone a trifle higher; also the recession in weight would have been more sharply defined, with all decreasing together. One of the parent birds was captured and found to weigh just ten grams. The maximum average weight of the little wrens was ten and five-sevenths grams, which was thus a considerable fraction of a gram, or more than 7 per cent, heavier than their parents. Weights subsequently taken were not very conclusive and failed to show much diminution. It seems quite probable that the reducing process was continued for a time after the nest was abandoned, but to what extent can only be conjectured. They left the nest younger by about ten days than the swallows, and with development of flight feathers much less advanced than in the case of those birds. It is a reasonable guess that their weight continued to decline until it was somewhat less than that of their parents.

VARIATION IN WEIGHT OF YOUNG WRENS

Days old	Grams	Days old	Grams
1	1 2/7	11	10 5/7
2	2	12	10 5/7
4	4—	13	10 3/7
6	6	14	10 4/7
7	7 3/7	16	10 5/7
8	8 4/7	17	10 2/3
9	9 4/7		
10	10		

Unsuccessful Weighing Attempts.—The English Sparrows earlier referred to, commenced incubation with five eggs. However, considerable of mystery surrounds the story of their endeavors. One egg disappeared; then one by one young birds did likewise, the last having been deliberately abandoned by its parents and allowed to perish of cold and hunger while they heartlessly loafed in the vicinity of the nest. It was then nine days old and weighed sixteen grams. The weighing of Yellow Warblers was begun in two instances, but both projects were terminated by the interference of (probably) Crows, the little birds having disappeared prematurely.

Conclusion.—The food of swallows is gathered in flight, and this fact suggests that wings need to be well developed to equip the young to make their own living. Therefore a longer occupancy of the nest seems logical, while possibly there is also a relation between the excess of weight reached by the young and this need of feather development. On the other hand, the little wrens upon leaving the nest take to the shrubbery where merely hopping about with very short flights is all that is required. The much greater nervous energy and alertness of the young wrens also is quite compatible with their mode of living, as contrasted with that of the swallows.

The young English Sparrow seemed to give promise of surpassing its parents in weight. Yellow Warblers at six days old appeared to weigh eleven grams, although difficulty in weighing them and an eccentricity of the scales may have made these data unreliable. In any case the little warblers were plainly not underweight in appearance.

This subject of reduction in weight in young birds seems interesting and worthy of further investigation.

Bellingham, Washington, November 30, 1929.

ROADS AND BIRDS

WITH TWO ILLUSTRATIONS

By JOHN McB. ROBERTSON

Any one who travels by automobile over our highways cannot fail to notice occasionally the remains of birds and mammals that have met their death by one means or another. As was shown in a recent article by Linsdale (*Condor*, xxxi, 1929, pp. 143-145), the whole story has not been told when we enumerate such casualties observed over certain time and space and proceed to deplore the great destruction of wild life. This roadside destruction of birds and mammals, and if we are sufficiently observant we can enlarge the case to include reptiles, amphibians and insects, is only one phase of the reaction of Nature to man's activities. Ever since man became a factor in the natural history of the earth he has been wielding an ever increasing power to change the other factors that make up his natural environment. Through willful destruction for food or pleasure and, more potently, through the destruction of old environments to make way for new ones more suited to his own needs, man has been an influence for good or evil to nearly all of his fellow creatures. And it is as only one phase of this ever changing scene that we must consider the influence of roadways upon birds and mammals. If we consider man and his activities as a phenomenon of Nature, a vast array of interesting problems, past, present and future, opens up before us.

I have observed this roadside mortality in an area five miles east and west by two and one-half north and south, lying around the towns of Buena Park and Cypress, in northwestern Orange County, California. This area lies entirely on the coastal plain and in a comparatively flat country without any marked physiographic features. The drainage is to the west and southwest into Coyote Creek. Prior to the agricultural settlement of this area, about forty-five years ago, it was used as cattle and sheep range, and the natural cover for birds and other animals was probably limited to a scattering of willows along Coyote Creek and a few elders and cactus patches on the so-called "sand ridges" that mark the last flood courses of the Santa Ana River over this portion of its debris cone. I have no knowledge of what the bird life was in those pre-cultivation days, but some of the changes that have come about during my lifetime are worthy of note.

With the destruction of the cactus from the "sand ridges" the Cactus Wrens and the Road-runners have gone from this area as residents although they sometimes stray into it from more favored areas where they still persist. On the other hand the Valley Quail, which probably used the same cover, have adapted themselves to the orange groves and other cover planted by man, and are found over a greater part of this area than formerly. With the development of farming came the artesian wells and irrigation. The old irrigation systems consisted of open reservoirs which grew up with tules and other water plants that furnished food and cover for marsh-loving birds. With the lowering of the underground water level, so that pumping became necessary, water was too costly to waste in open reservoirs, so now they are gone; and underground pipe lines do not form haunts for Coots and Red-winged Blackbirds. The Red-wings have taken to nesting in the orange groves in some cases, but the Coots are found along Coyote Creek only. I have recorded the coming of Screech Owls as residents of this area (*Condor*, xxiii, 1921, p. 138; xxvii, 1925, p. 38; xxix, 1927, p. 203), and at the present time, the Bush-tit, the California Jay, and the Crow are becoming established as breeding birds. Another

conspicuous change of the last ten years is the coming of the California and Ring-billed gulls to feed behind the plow during the winter season.

Thus we may enumerate some of the changes in bird life brought about through man's activities; now let us consider the influence of our modern highways and our ever increasing automobile traffic, and it will not be long before we will have to consider the air traffic also. The roadways in this area are of two kinds, the paved roads and the oiled dirt roads. Roadside shrubbery is almost entirely lacking, shade trees where present are spaced far apart and even the weeds that grow up each year are usually cut before they are of much benefit to the birds; so the immediate roadsides are not here to be considered as equivalent to streambanks, as may be the case in other regions. Some weed-grown fences exist, well back from the road, and several eucalyptus groves furnish cover for some birds, while orange groves and various field crops give cover and food in the areas adjacent to the roads.

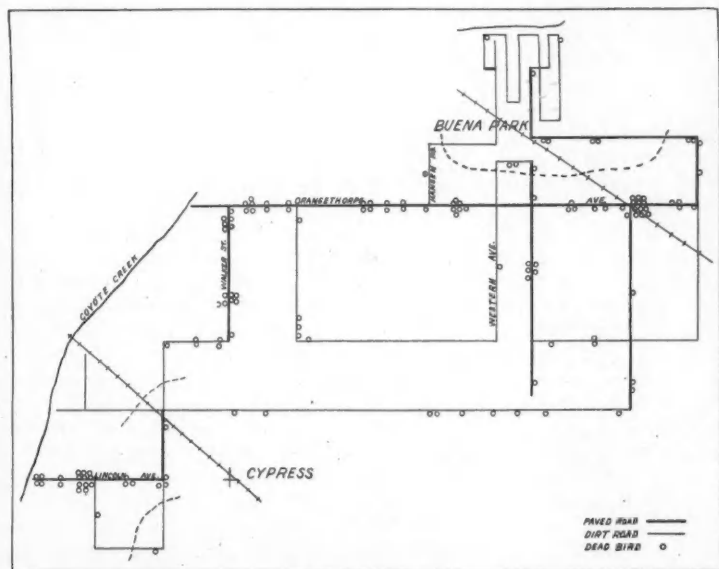


Fig. 48. DEAD BIRDS FOUND ON RURAL MAIL ROUTE NO. 1, BUENA PARK, CALIFORNIA, NOVEMBER 1, 1927, TO OCTOBER 31, 1928.

In some of the more thickly settled parts of the area lawns and shrubbery about the houses are inviting to many birds, and palms of two kinds shelter colonies of English Sparrows. The telephone and power pole lines are conspicuous features along most of the roads and should be considered as a part of the road system. These poles and wires furnish perches for many birds and are probably helpful to such birds as Shrikes and Sparrow Hawks that watch the ground for their prey; Western Kingbirds have been known to nest on a pole and the only Red-shafted Flicker nest known to me in this area is in a power pole. But on the other hand, these wires are dangerous to some birds which fly against them, and the larger hawks perching on roadside poles or fences are conspicuous targets for thoughtless gunners.

Now to pass from generalities to actual observations: For one year, from November 1, 1927, to October 31, 1928, I kept a record of all the dead animals observed along my rural mail route. Figure 48 shows the roads covered, a total of 30.3 miles; the heavy lines indicate the 9 miles of pavement and the lighter lines the 21.3 miles of oiled dirt roads. This route was covered 287 times during the year and the small circles indicate the locations of the 136 dead birds observed. This is not a complete record for the year because I was absent on vacation for eighteen days in August and birds killed on Sundays or holidays might be reduced to an unrecognizable spot on the pavement before the next day. The casualties indicated are as follows: English Sparrow 28, Coot 16, Western Meadowlark 15, California Shrike 10, Brewer Blackbird 9, Linnet 8, Gambel Sparrow 8, Killdeer 7, Mourning Dove 4, Western Mockingbird 4, Barn Owl 3, Western Kingbird 3, Brown Towhee 3, California Horned Lark 2, Arizona Hooded Oriole 2, California Gull 1, Western Red-tailed Hawk 1, Burrowing Owl 1, Texas Nighthawk 1, Red-shafted Flicker 1, Golden-crowned Sparrow 1, Western Lark Sparrow 1, Green-backed Goldfinch 1, Savannah Sparrow (subsp.) 1, Black-headed Grosbeak 1, Cliff Swallow 1, Pipit 1, and unidentified sparrows 2. As shown by figure 48 the 9 miles of pavement claimed 104 of the casualties and the 21.3 miles of dirt road only 32.

I did not see any of these accidents happen. I believe that most of them happen at night or perhaps at dusk or dawn rather than during the day. A recent article by Wetmore (Bull. Northeastern Bird-Banding Assn., v, no. 4, October, 1929, pp. 141-143) discusses this question of the time when such accidents are most apt to occur, as well as other phases of the problem. There are several dangers to be considered in connection with roads; first and probably most important are automobiles, then overhead wires, and destruction by shooting. It is difficult to arrive at a fair estimate of the relative danger from automobiles and overhead wires. The one Western Red-tail was a victim of shooting; the Coots, I believe, were killed by flying into wires at night. In checking up I find that only four of the birds were found where there were no overhead wires, thirty-six where the wires were on one side of the road and ninety-six where the wires were on both sides; but as the busiest highways are very apt to have pole lines on both sides and only a very small part of the roads have none at all this evidence is not very reliable.

As will be seen in figure 48 there are several well defined groups of casualties and I will analyse some of them. The group on Orangethorpe Avenue just east of the railroad contains twelve casualties as follows: English Sparrow 6, Brewer Blackbird 1, Hooded Oriole 1, Linnet 1, Black-headed Grosbeak 1, Shrike 1, Mockingbird 1. The roadway has palms, backed up by berry patches and fruit trees, on the south side, and a dairy, small vineyard, and a farm yard on the north side. There is a suspicion of small boys with .22 rifles as an extra hazard here. There are wires on both sides of the road.

On Orangethorpe Avenue between Western Avenue and Hansen Road is a compact group of seven. At this place there are two fan palms on each side, well back from the road, and each harboring a colony of English Sparrows. Six of the seven casualties were English Sparrows, the other being a Brown Towhee. Overhead wires on both sides of the road would not seem to be the cause of these casualties.

On Walker Street just south of Orangethorpe Avenue a group of six casualties is found to consist of four Meadowlarks and two Shrikes. At this place there are no trees or shrubbery and not even weeds most of the time. On the west side

is a field of alfalfa and on the east side is pasture land. An occurrence noticed here a number of times illustrates how a paved road may be both a source of food and a menace to the lives of the birds. In late spring and summer the southwest breeze blows insects from the alfalfa field onto the concrete pavement and birds of several species come to gather the resulting harvest of easily found food. Brewer Blackbirds are in the majority, but Meadowlarks, Horned Larks, and Shrikes have been seen to do this. I do not know if extra alertness on the part of the Blackbirds and Horned Larks accounts for their absence from the casualty list at this place or not. Overhead wires on one side do not seem to be a dominant factor here.

Farther south on Walker Street a group of seven appears: English Sparrow 3, Linnet 2, Burrowing Owl 1, and Gambel Sparrow 1. The stage setting here is a chicken ranch on the west side and a weed-grown field on the east side, with a pole line on the west side.

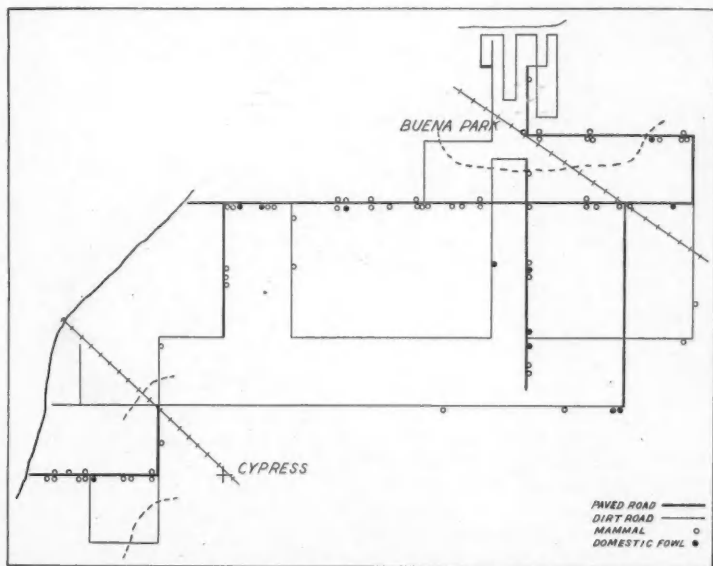


Fig. 49. DEAD MAMMALS AND DOMESTIC FOWLS FOUND ON RURAL MAIL ROUTE No. 1, BUENA PARK, CALIFORNIA, NOVEMBER 1, 1927, TO OCTOBER 31, 1928.

Nearly one mile of Lincoln Avenue is covered by the route and shows twenty-three casualties as follows: Coot 8, Meadowlark 6, Brewer Blackbird 3, Killdeer 2, Western Kingbird 1, Linnet 1, Gambel Sparrow 1, and Shrike 1. This road is bordered by farm land and several dairies and has a pole line on one side. A flight line of Coots from the ponds of the Farmers Gun Club, a mile to the south, to Coyote Creek, would seem to account for the fact that one-half of the Coots found in the whole area were on this mile of road. I think the wires are responsible for the killing of most of the Coots.

In an effort to throw some light on the relative importance of automobiles and overhead wires in this destruction of life I have charted the mammals and domestic

fowls killed on the same roads during the same period of observation. Figure 49 shows sixty-two mammals as follows: Cat 21, jack-rabbit 15, dog 8, cotton-tail rabbit 5, ground squirrel 4, pocket gopher 3, mouse 2, rat 2, weasel 2; and in addition, domestic fowls 12 (chicken 8, pigeon 2, duck 1, and Guinea fowl 1). In every case except that of the pigeons the overhead wires would seem to be out of the question; so, as they are grouped very much the same as the bird casualties are, they would strengthen the idea that automobiles constitute a more potent factor than overhead wires.

This article does not pretend to exhaust the possibilities of the subject. For instance, a study could be made of the casualties of some section of a road in relation to the time of day and the amount of traffic; and the relation of roadside cover to such accidents, the spacing and number of wires on pole lines, the season and the condition of the weather, and many other possible factors could be studied. But the observations above recorded lead me to the conclusion that roadside mortality is only a minor factor, although a conspicuous one, in the avian reaction to the activities of man, in the area under consideration, and that the species that suffer most are abundant ones that seem to be in no danger of extermination from this cause.

Buena Park, California, November 21, 1929.

RUSSELL W. HENDEE

WITH ONE ILLUSTRATION

By ALFRED M. BAILEY

Russell W. Hendee, an active member of the Cooper Ornithological Club since 1923, and for the past ten years a skilled field naturalist, died in a French hospital in Viennet, Indo-China, from a virulent form of malarial fever, while serving as mammalogist of the Kelley-Roosevelt Expedition of the Field Museum. By his untimely death, the scientific world lost one of its most promising young naturalists. He had traveled and collected extensively in three continents and he had gained a wide knowledge of the animal life of these remote places.

He was born February 5, 1899, in Schuyler, Nebraska, the son of Elizabeth Russell and Reverend Alvin M. Hendee of Hansen, Nebraska. His education began in the public schools of Sumner and Hopkinton, Iowa; he also attended Lenox Academy in Hopkinton, and graduated from the Academy of the University of Dubuque, in Dubuque, Iowa, in 1917. In 1921, he received his Bachelor of Arts degree *in absentia* from the State University of Iowa.

While in the University of Iowa, he specialized in zoology and museum training under Professor H. R. Dill, and accompanied one university expedition to the mountains of Washington to collect zoological specimens. He became proficient in preparing specimens for exhibition, but his love of the outdoors, and his ability as a writer and observer fitted him for the life of a field naturalist rather than that of a laboratory man.

In June, 1921, Mr. Hendee and the writer sailed from Seattle for Arctic Alaska on an expedition for the Colorado Museum of Natural History. We reached Nome late in June and worked the tundras of that vicinity until early July, and then set sail on the old coast guard cutter "Bear" for the islands of Bering Sea and the eastern shores of Siberia. Collections were made on King and St. Lawrence islands, and Hendee remained on St. Lawrence Island for one week, while the "Bear" cruised Providence Bay. Early in his collecting career, Hendee proved his resourcefulness and ability as a student, naturalist, and out-of-doors man. The opportunity to work the islands of Bering Sea had been unexpected, and as our camp equipment had been sent on a schooner to another port, our outfit for working St. Lawrence Island was utterly inadequate. Hendee asked to be allowed to work with the island natives, even though blankets could not be spared from among the ship's stores. He solved these sleeping difficulties by resting a few hours when the sun was at its highest, and spending the cold hours of the day in hunting and preparing his specimens.

Later, in the winter, while hunting caribou ten days' journey inland from the Arctic coast near the northern base of the Endicott Mountains, he was overtaken by darkness while many miles from camp. He had just killed a big bull caribou, and realizing that it would be impossible to find his way over the flat tundra with its many snow-drifted coulees, he skinned out his animal and rolled up in the hide, with the intention of spending the night. After he had been resting a few hours, the moon came up above the horizon, and he then backtracked for ten miles across the wind-blown waste to his camp. He related with amusement how he had found his badly frightened old Eskimo companion, Kogmuk, sitting with a lantern on the highest knoll, awaiting his return, and how relieved the old fellow was when he heard Hendee's footsteps.

Winter headquarters were made at the little Eskimo village of Elronik, known on the map as Wainwright. This is about one hundred miles down the coast from Point Barrow. We spent the fall and winter collecting in that vicinity, with the Eskimos and one other white man, James Allen; and then in the spring, while the writer dropped down the coast to Cape Prince of Wales, Hendee worked with Allen



Fig. 50. RUSSELL W. HENDEE; WAINWRIGHT, ARCTIC ALASKA, NOVEMBER, 1922.

far out on the ice floes, making notes on the off-shore migration of birds and sea mammals, and collecting series of rare sea birds. The white men, with their Eskimo crews, pitched camp at the edge of the flaw and hunted the great bowhead whales. (The accounts of his observations on birds were included in one general report, and

were published by the writer in the *Condor*, xxvii, 1925, pp. 20, 62, 101, 164, 197 and 232, and xxviii, 1926, pp. 31, 84, 121 and 165.) The following summer when the ice receded from the coast, he loaded all his specimens on the "Bear", and after again being given the opportunity to work on King Island and at Dutch Harbor, he returned to Seattle.

During the next four years, Hendee was associated with the Colorado Museum of Natural History, and was given many opportunities to become familiar with the animal life of Colorado. With various members of the staff of the Museum, and with W. C. Bradbury, the well-known oologist and former member of the Cooper Club, he covered the state from the highest peaks to the lowest prairies, and as the work of the museum covers all fields, he gained a wide knowledge of field work and museum preparation.

His experience in the Arctic and in Colorado fitted him for the leadership of important museum trips, and in April, 1925, he sailed from New York for Peru to collect mammals for the British Museum. While his efforts were directed toward securing the varied mammals of Peru, his notebooks were filled with interesting data on the habits of the birds of the different zones of that mountainous country. Hendee was a tireless worker, and fearless in the extreme. He was always thoughtful of the people about him, of a quiet temperament; and as he adapted himself to all conditions, he was very successful in his pursuits. He was an adept at languages. In the Arctic he picked up a surprising command of the Eskimo tongue in a winter and two summers among the natives, and in South America he quickly learned Spanish. I am told that he was able to converse in French, at the time of his death, even though he had been in Indo-China but a few months. While it is true that he learned languages quickly and was skilled in writing, he did so because he had learned to apply himself. He never allowed physical discomforts to interfere with any of his plans, and he never complained when difficulties were to be overcome. In Peru, he was often in out-of-the-way places with but a single native companion, and although working under the greatest difficulties, he carried his three years' program to a successful conclusion.

Even in early life, he showed strong will power. As a youngster in Iowa when about twelve years of age, he lost his footing along a precipitous wall and fell upon a mass of rocks. At supper that evening he was very quiet, and retired to bed early. The next day he was unusually quiet and his mother questioned him. She found he had a broken collar bone. These qualities of grit and dogged determination were reflected in his work in after life. He was not powerful physically, but he was able to do more work than most men of superior strength.

His work in Peru was especially successful, and Oldfield Thomas characterized him as being the most skillful field man he had ever employed. He collected many new species of mammals, and one new genus, in regions which had been searched by other mammalogists, including such well known collectors as Dr. W. H. Osgood and Mr. Edmund Heller.

After his return from South America, Hendee served temporarily on the staff of the Record Press of Marlborough, and as the editor of the Highland Post of Highland, New York, and then, in the autumn of 1928, he joined the staff of the Field Museum and sailed with four companions for Indo-China. Mr. Harold Coolidge, one of his companions, states that on May 14, Hendee left the members of the expedition who had been working together, and began the twenty-day journey to Hue and three days to Saigon where he was to join the Roosevelts on the other section of the expedition.

For eight days he traveled down the river in a convoy of seven medium-sized native canoes. There were numerous rapids, and at one place a canoe capsized, but everything was eventually saved. Hendee arrived in Luang Prabang in good health, and the fifty boxes he had with him were safe. The canoe that capsized contained his own personal effects.

Hendee spent a few days at Luang Prabang and then continued his journey down the Mekong River on a large raft. Sharing his raft with him was a French school inspector who reported that Hendee was well when they left Luang Prabang, and that he had his first fever on the 27th. He grew worse and the raft was hurried as fast as possible to Viene-tiane, which place they reached on the night of June 3. Early in the morning of June 6, he seemed to be resting quietly, but at 11:00 o'clock the doctor was called hurriedly and he found that there had been a violent cerebral attack (sometimes characteristic of the typho-malarial fever which he had) and that this had resulted in probably instantaneous death.

The funeral was held in a small bamboo shelter, and the services were read by the Reverend M. Roffe, a young Canadian pastor who was doing missionary work under the Interdenominational Missionary Alliance. It was attended by the other members of the expedition, by the Governor of the Province, the French government officials, and a delegation of two hundred school children. The King of Luang Prabang, in recognition of the scientific work accomplished by Hendee in his kingdom of Laos, made him, posthumously, a Chevalier of his Royal Order.

The body was cremated, and the ashes, accompanied by Mr. Coolidge, arrived in Schuyler, Nebraska. Burial services were conducted here, with interment in Schuyler cemetery where rest the remains of the father and a sister.

While in Peru, Hendee became engaged to Miss Edelmira Diaz, a director of the schools of that country. It was impossible for Miss Diaz to accompany Hendee on his long zoological exploration trip down the eastern slope of the Andes, to the headwaters of the Amazon, so it was arranged that she should join him in New York. In order that there should be no difficulty, a marriage ceremony was performed in February, 1929, in Iquitos, Peru, in which an uncle of the bride legally represented Hendee. Mrs. Hendee left at once for the United States, with the expectation of meeting her husband in London, and since early in April, had been making her home with her husband's mother in Brooklyn, New York.

Surviving Hendee are his bride, his mother, Mrs. Elizabeth R. Hendee of Brooklyn, New York, and his sister, Mrs. Elizabeth H. Plank of Marlborough, New York.

Hendee was taken from his work before he was able to put the results in writing, so his publications are few. His well-filled notebooks are stored with information on the plants, animals, and people of different lands, but he did not have time to compile the notes in manuscript form. That he was a writer of ability is proven by the fact that the Atlantic Monthly had contracted for a series of articles on his work in Peru and Alaska, and the few stories which were completed are now awaiting publication.

In addition to the notes of Hendee, which were included in the report of the Alaskan expedition mentioned above, he was joint author with the writer of "Notes on the Mammals of Northwestern Alaska," published in the Journal of Mammalogy, (vii, 1926, pp. 9-28). His report on an expedition for the Colorado Museum of Natural History in northwestern Colorado, "Notes on Birds Observed in Moffat County, Colorado," was published in the Condor (xxxI, 1929, pp. 24-32).

Russell Hendee accomplished more in his short span of life than most men who live their allotted time. He was always conscientious and considerate, and I can think of no better eulogy than the words of an Eskimo of the little village along the Arctic coast where Hendee carried on his first extensive field work. The grizzled old native had come in contact with many types of people, and his short description is one worth while. He said, "What Hendee says—he does."

Chicago Academy of Sciences, Chicago, Illinois, January 3, 1930.

TWO FOSSIL BIRDS FROM THE MIOCENE OF NEBRASKA

WITH SIX ILLUSTRATIONS

By ALEXANDER WETMORE

In field work for the Museum of Comparative Zoölogy dealing with vertebrate fossils, Mr. Erich M. Schlaikjer has recently obtained a few remains of fossil birds from the Miocene deposits of Sioux County, Nebraska. These have been placed in the hands of the writer for study and prove to include two peculiar species, both new to science, which are named and described below. They form an important addition to the series of avian species now known from this area, which has proven one of those important in giving us information concerning the wonderful bird-life of the Tertiary in North America. Much is due Mr. Schlaikjer for the careful attention that he has shown in obtaining in excellent condition the delicate bones here under discussion.

With the two specimens described there come a broken ulna, a pedal phalanx, and a broken vertebra, from the same locality as the grouse, which represent a hawk of the family Accipitridae that may not be identified specifically from these remains.

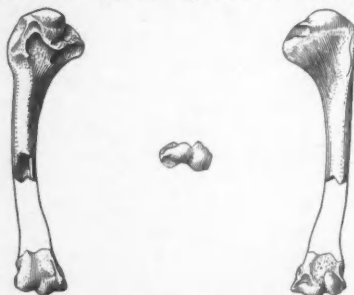
Drawings illustrating this account have been made by Mr. Sydney Prentice.

Family TETRAONIDAE

Palaelectoris incertus gen. et spec. nov.

Characters.—Humerus somewhat similar to the living *Canachites canadensis* (Linnaeus)¹ but decidedly smaller; crista superior more developed, projecting farther, with free margin more rounded; depression below caput humeri less deeply impressed; proximal margin of incisura capitis higher on side of caput humeri; tuberculum inferior relatively broader; radial trochlea relatively smaller, less curved, relatively shorter.

Description.—Type (figs. 51-53), Museum of Comparative Zoology, cat. no. 2190, proximal and distal parts of left humerus with part of shaft missing, collected in



FIGS. 51 TO 53. TYPE OF *Palaelectoris incertus*, NATURAL SIZE, MISSING PORTION OF HUMERUS INDICATED BY UNSHADED LINE.

the Lower Miocene of the Agate Springs quarries, Sioux County, Nebraska, summer of 1928, by E. M. Schlaikjer. Shaft slender near center, expanding broadly to support head, rounded; pronounced depression on anconal face below head sharply delimited except toward the pneumatic foramen where it is open, merging without break with the shaft; caput humeri elongate, rounded, rising as a pronounced prominence; crista superior a narrow plate, thickened toward the center and narrowed at either end, in lateral outline rounded, sub-triangular, strongly projecting at the center; insertion of pectoralis major a broadly rounded ellipse; bicipital surface smoothly and gently rounded; coracohumeral groove deeply impressed externally, becoming rapidly shallow internally to disappear a short space beyond the median axis of the head; incisura capitis deep, with abrupt walls, but making only a slight notch on the outer margin of the head; crista inferior projecting, strongly rounded; (tuberculum inferior broken away); tuberculum exterior elongate but low, with only slight projection; pneumatic foramen small; (center of shaft missing); lower end of shaft broad and flattened to support condyles; radial condyle elongate

median axis of the head; incisura capitis deep, with abrupt walls, but making only a slight notch on the outer margin of the head; crista inferior projecting, strongly rounded; (tuberculum inferior broken away); tuberculum exterior elongate but low, with only slight projection; pneumatic foramen small; (center of shaft missing); lower end of shaft broad and flattened to support condyles; radial condyle elongate

¹ *Tetrao canadensis* Linnaeus, Syst. Nat., ed. 10, vol. 1, 1758, p. 159. (Hudson Bay.)

elliptical, with free surface somewhat flattened and very slight distal flexure, at upper end terminating abruptly; ectepicondylar process a slightly projecting plate, poorly defined except for its low tip; intertrochlear sulcus nearly a right angle; ulnar tubercle rounded, only slightly elongate, projecting well below line of radial condyle; entepicondylar process projecting as a distinct angle; depression of brachialis inferior well marked and rather broad. Specimen grayish white in color and strongly fossilized.

Measurements.—Transverse diameter of shaft slightly above center 3.8 mm.; greatest breadth of head 11.1 mm.; greatest breadth across condyles 8.2 mm.

Remarks.—The present form is described in the family Tetraonidae where it is compared with *Canachites* among the North American species though its relationship to the spruce partridges is seemingly rather distant. The form and outline of the crista superior as well as of the head of the humerus in general are much like that of *Ortalis*, in the Cracidae, the resemblance here being surprisingly close; but this appears to come from convergence in development rather than from actual relationship to the cracid group. The projection of the ulnar tubercle below the general level of the lower end of the bone, and the strong impression below the head on the anconal surface, are sufficient to place the species in the Tetraonidae, where as indicated above it is somewhat aberrant.

In size *Palaelectoris* appears intermediate between the bob-whites and the spruce partridges. There is little else that may be said about it except to note that seemingly it has no near relatives among our other known fossil gallinaceous birds.

In connection with this species it is pertinent to mention the proximal articular surface of a tibio-tarsus, U. S. Nat. Mus. no. 11,983, collected on May 17, 1925, in the Calvert formation of the Miocene of Maryland, one-half mile south of Randall wharf, near Chesapeake Beach, Calvert County, Maryland, by Dr. Remington Kellogg and Mr. Norman Boss. This comes from a species of grouse and exhibits the general outline of *Canachites canadensis*, with the articular facets more deeply excavated, the internal one being especially deeply cut. The depth of this suggests strongly the condition found in the genus *Ortalis* of the Cracidae, but the general outline of the bone is distinctly that of *Canachites*, from which it differs in decidedly smaller size. The difference in size is of the amount that distinguishes the humerus of *Palaelectoris incertus* from that of *Canachites*. Taken with the resemblances discussed above, this seems to indicate that the Maryland fossil may be generically the same as the species here named from Nebraska. After comparison with an extensive series of modern species of the order Galliformes the Calvert specimen is identified as *Palaelectoris* sp., with the statement that it is believed to be closely allied to *P. incertus*. The presence of this bone in marine strata near Chesapeake Beach must be considered an accidental occurrence.

Family HAEMATOPODIDAE

Paractionis perpusillus gen. et spec. nov.

Characters.—Metatarsus generally similar in form to that of *Haematopus palliatus* Temminck¹ but with anterior face of shaft flat and plane without pronounced ridges, lower end of shaft relatively more slender; inner trochlea less heavily supported where it joins the shaft at its base; proximal end of shaft more narrowly ridged posteriorly; size very much smaller.

Description.—Type (figs. 54-56), left tarso-metatarsus, complete except for slight imperfections of the head, Museum of Comparative Zoölogy, cat. no. 2191, from Lower Miocene of Carnegie Hill, Agate fossil quarry, Sioux County, Nebraska, collected August 22, 1929, by Erich M. Schlaikjer. Proximal articular surfaces of

¹ *Haematopus palliatus* Temminck, Man. Orn., ed. 2, vol. 2, 1820, p. 532.

head largely missing; head rather abruptly expanded from shaft with a pronounced depression below on anterior face of shaft; talon square, block-like, with three pronounced ridges marking the limits of two grooves, the inner crest projecting decidedly



Figs. 54 to 56. TYPE OF *Paractiornis perpusillus*, NATURAL SIZE.

beyond the rest of this structure; shaft slender; anterior face transversely plane with right-angled margins, sides nearly flat with posterior face more or less rounded; expanded and flattened transversely at lower end to form a support for the trochlea; a very large inferior foramen situated at the bottom of a short, broad groove; facet for articulation of first toe small but evident; inner trochlea projecting posteriorly as a flattened plate that projects back past the line of the shaft, being swung back so that the inner face of the middle trochlea is entirely exposed, its distal margin reaching slightly beyond the base of the middle trochlea, its posterior margin marked by a slightly projecting, flattened tubercle, its inner face much excavated; the middle trochlea projecting distally far beyond the level of the other two, in lateral outline elliptically rounded, its lateral faces much excavated, and its distal margin deeply grooved, on its posterior face the inner margin cut away at an angle; outer trochlea flattened, swung far back posteriorly, its free margin grooved and its external edge projecting as a distinct, flattened plate or ridge; sulci between the trochleae relatively broad and open. Specimen grayish white in color and well fossilized.

Measurements.—Total length 30.5 mm.; greatest breadth of head 4.2 mm.; greatest breadth across trochlea 4.0 mm.; smallest transverse diameter of shaft 1.4 mm.

Remarks.—The metatarsus from which this interesting species is described is in perfect condition except for the proximal articular surface of which only parts of two facets remain, so that its characters are easily apparent. The general contour and sculpture is that of the modern oystercatcher except in the details noted in the diagnosis, the similarity being so close that the differences listed are seen only on careful scrutiny.

On the basis of this metatarsus it appears that *Paractiornis* was about the size of a sanderling or a Wilson phalarope, so diminutive a member of the family seeming truly remarkable in view of the dimensions of the living species of this group. The further fact that it comes from the interior, away from the Miocene sea-coasts, is also subject for consideration, giving indication of range in ecological preference in this family that may be construed to mean that the living *Haematopodidae* are only a remnant of a group that at one time contained a considerable diversity of species.

Smithsonian Institution, Washington, D. C., March 1, 1930.

TWO NEW RACES OF THE LOGGERHEAD SHRIKE FROM WESTERN NORTH AMERICA

By ALDEN H. MILLER

The examination of an assembled loan collection of approximately 1500 specimens of the Loggerhead Shrike (*Lanius ludovicianus*) from territory west of the Mississippi River has revealed the existence of two races formerly classified under the wide-ranging subspecies, *excubitorides*.

Lanius ludovicianus sonoriensis, new subspecies Sonora Loggerhead Shrike

Type.—Male adult, no. 54484, Mus. Vert. Zool.; Whitetail Cañon, elevation 5000 feet, Chiracahua Mountains, Cochise County, Arizona; April 15, 1915; collected by A. J. van Rossem; orig. no. 4204, coll. J. E. Law; presented to Mus. Vert. Zool. by J. Eugene Law.

Diagnosis.—Largest of the subspecies of *Lanius ludovicianus*, particularly as regards the length of tail. Tail length averaging 106.7 mm. (measured from the oil gland), in adult (second-year or older) males, and 105.3 mm. in adult females. White on primaries extensive. White on outer rectrices less extensive than in *excubitorides*. Upper parts, except for white of rump, between neutral gray and light neutral gray (see Ridgway, Color Standards and Color Nomenclature, 1912, pl. LIII). Under parts immaculate white in second-year birds. Tarsus and bill long.

Measurements of the type.—Wing, 103.3 mm.; tail, 110.0 mm.; tarsus 27.9 mm.; bill length measured from nostril, 12.1 mm.; extent of white on primaries, 58.0 mm.

Comparisons.—The coloration of *sonoriensis* closely resembles that of *excubitorides*, the name now restricted to birds from the plains east of the Rocky Mountains, except that the head and back are more nearly neutral gray in contrast to the carbon or gull grays of Saskatchewan birds. The size is much larger and the white areas of the rectrices, on the average, less extensive than in *excubitorides*. The light coloration above and below marks the new race as distinct from *grinnelli* and *gambeli*. The tail averages longer than that of *ludovicianus*, *mexicanus*, or *grinnelli*, which subspecies most nearly approach the new race in this respect. The wing of *sonoriensis* is longer than that of *migrans*. The head and back are distinctly lighter than the corresponding parts of *mexicanus*.

Range.—Resident throughout the year from the Colorado Desert of California and the Colorado Delta region of Lower California east through Arizona south of Mohave, Yavapai, Navajo, and Apache counties to southern Grant, Luna, and Dona Ana counties in New Mexico; southeast along the valley of the Rio Grande to Brewster County, Texas; and south through the states of Sonora, Chihuahua, northern Durango and Sinaloa, Mexico, to the vicinity of Mazatlan.

Remarks.—*Sonoriensis* intergrades with *excubitorides* in New Mexico east of the Rio Grande and in Texas in the region of the Pecos River. Intergradation with *grinnelli* takes place north of San Felipe, and probably also in the San Rafael Valley east of Ensenada, Lower California. *Gambeli* is known to intergrade with *sonoriensis* along the eastern margin of the mountains of San Diego County and again at San Geronio Pass, Riverside County, California.

Sonoriensis, in so far as known, is non-migratory. Shrikes of other races such as *gambeli* and the form next to be described may be found in winter within the range of *sonoriensis*.

The fresh fall plumage of the first-year birds of the Sonora race shows little of the brown or buff vermiculation commonly seen in comparable plumages of other races of shrikes occurring west of the continental divide. The juvenal plumage is comparatively light colored and the vermiculations are faint.

Lanius ludovicianus nevadensis, new subspecies

Nevada Loggerhead Shrike

Type.—Female adult, no. 22625, Mus. Vert. Zool.; Lone Pine Creek, elevation 4500 feet, Inyo County, California; April 11, 1912; collected by H. S. Swarth; orig. no. 9406.

Diagnosis.—Head and back near neutral gray (see Ridgway, *op. cit.*, pl. LIII), rump white. Under parts white in second-year birds, faintly shaded or vermiculated with buff and gray in many first-year birds. Size similar to that of *gambeli*, wing averaging 100.2 mm., tail, 102.4 mm., in adult (second-year or older) males; wing, 98.1 mm., tail, 100.3 mm., in adult females. White tipping on outermost rectrices not extensive, averaging 34.1 mm. in adult males and 29.6 mm. in adult females.

Measurements of the type.—Wing, 96.8 mm., tail, 101.0 mm., tarsus, 26.0 mm., bill length measured from nostril, 11.3 mm., tipping on outermost rectrix, 28.0 mm.

Comparisons.—*Nevadensis* resembles *excubitorides* in the color of the under parts but the back is neutral gray instead of gull gray. Furthermore, the white tipping of the rectrices in *nevadensis* is much less extensive than in *excubitorides*. The gray of the back, although of the same hue as that of *sonoriensis*, is of a slightly darker tone. However, the Nevada bird is decidedly smaller than *sonoriensis*. *Nevadensis* differs from *gambeli* in the pure white of the rump and under parts of adult birds, which areas are gray or vermiculated with brown in the latter. Also, the dorsal coloration is darker and browner in *gambeli* than in *nevadensis*.

Breeding range.—From southern Harney and Malheur counties in Oregon south through Nevada, and in adjacent parts of California from Mono County southward, east of the Sierra Nevada (but including the Kern River basin in the southern San Joaquin Valley) to the Tehachapi, San Gabriel, and San Bernardino mountains and the vicinity of Needles in the Mohave Desert. The eastern limits of the race probably extend into parts of Utah and northern Arizona but exact localities can not be designated by reason of the limited collections from the regions concerned.

Remarks.—Intergradation with *gambeli* is known to occur in Kings, Tulare, and northern Los Angeles counties, California, and in Lake, Harney, and Malheur counties, Oregon. Breeding birds from southeastern San Bernardino County, California, are intermediate between *sonoriensis* and *nevadensis*.

Nevadensis performs at least a partial migration in the northern part of its range. Birds of this race have been found wintering in the Coachella and Imperial valleys of California.

Juvenal and fresh fall plumages of immature Nevada birds resemble closely the comparable plumages of *gambeli* although the former average lighter on both dorsal and ventral surfaces.

Museum of Vertebrate Zoology, Berkeley, California, March 2, 1930.

FROM FIELD AND STUDY

More about Hawks.—I read with great interest the recent article (Condor, xxxii, 1930, p. 15) by McAtee and Stoddard in defense of hawks and owls, the methods heretofore employed in investigating their food habits, and expressing the disfavor of papers that tend to supply ammunition for those who are proponents of the extermination of our raptors. With all their views I am in hearty accord. The above article has prompted me to call attention to an aspect of the matter which is seldom or never considered in the discussions pro and con the conservation of our so-called predaceous animals.

Major Brooks (Condor, xxxi, 1929, p. 222) has published his observations of the frequent capture and consumption by bald eagles of scoters and grebes; and, of course, in ornithological and sporting literature there is much reference to the destruction of other birds even by such species of hawks and owls as are not considered habitually to feed on such prey. The unthinking reader takes such statements at their face value and accordingly condemns the species concerned as destructive in greater or lesser degree; and it is rather astonishing that ornithologists apparently follow the same course.

Having had experience in collecting both scoters and grebes, and having been highly exasperated by the manner in which the former dives beneath the water from full flight without a pause, and both disappear from the surface, at the flash of a gun, I am extremely loath to believe that any bald eagle can regularly capture either scoter or grebe in good health and in full possession of its normal faculties. Having never observed the technique employed by a bald eagle on such a quest I will concede the possibility that I may grossly under-estimate the skill of that grand bird; but nevertheless I am ready to argue the point with considerable spirit and no little determination, backed by the concurrent opinion of a number of able ornithologists with whom I have talked.

But that is neither here nor there in the present instance. The point at issue is the fact that almost never is it taken into consideration that many of the game birds, as well as those of non-sporting sorts, caught by hawks and owls, bob cats and foxes, are ailing, either from sickness or injury. All of our wild life is abundantly used to coping successfully with its natural enemies in normal numbers, and a healthy individual is able to take care of itself in the vast majority of cases. Of course there are exceptions, both as concern the individual and restricted areas, as when a flight of goshawks has descended upon the luckless heath hen remnant on Martha's Vineyard.

A raptor's very existence is often dependent upon its ability to discriminate instantly between prey that it can capture with relative ease, and that which may be secured only after the expenditure of a disproportionate amount of effort. It is such an ingrained ability that it may be considered as virtually instinctive for a hawk to discern in a split second the bird or small mammal that for any reason is acting abnormally. This accomplishment appears to be common to all predaceous birds and mammals. Instances where hungry wolves can tell that an approaching fellow has been slightly wounded and promptly fall upon and devour the unfortunate, or coyotes congregate to pull down an ailing steer (for which they are always blamed rather than praised), are not mere travelers' tales but are sound truths.

In spite of this we are prone to lose sight of the fact that the role in nature of the predators is that of a sanitary brigade. They are essential elements of any and every fauna, promptly to eliminate those individuals that have fallen ill before the latter shall have had opportunity to transmit the ailment to their healthy comrades; and to act as a check upon overcrowding, so as to prevent the epidemic usually consequent upon any marked augmentation in numbers.

Significant in this connection are the conclusions of Dr. August Brinkmann who, after investigating the alarming reduction in Norway of the willow grouse, ascertained that this was ascribable to recent great destruction of birds of prey. Lacking predators there was at first an increase in the grouse population, followed by sickness, and the lack of natural enemies permitted the spread of this in disastrously epizootic form. In addition, Dr. Schroeter, another European conservationist, has reported that a number of years ago the foxes were purposely extermini-

nated from a certain district in Bohemia, and following this action there occurred such a severe epidemic among the hares of this area that it was necessary to reintroduce foxes.

It is my personal conviction that if our hawks and owls now existed in something like their former numbers, bird malaria would be far less prevalent among the quail of California, and that the very existence of the eastern ruffed grouse would not now be threatened by a complex of diseases.

This being the case—that the sanitary brigade as represented by our predators is a very vital factor in the numerous representation of our game bird species—ornithologists should certainly be the last to condemn unqualifiedly the killing of an occasional individual, but rather presume that in the majority of instances every two out of three birds captured were on the sick list. The third may be cheerfully ceded, by sportsman as well as conservationist, as payment for the good office performed in removing a threatened source of infection, even without taking into account the injurious rodents that have been eaten between times. Naturally, however, when goshawks or other habitual game-getters invade territory in which birds are being raised or conserved in large numbers, that is a horse of another color.

And to those who may be reluctant to concede that more sick than healthy birds are usually captured by the hawks that frequently favor such fare, I would say that I, as an American citizen, am entitled to my just share of ducks, grouse and quail—perhaps not to the tune of fifteen per day during the open season, but to my fair proportionate share. During the last ten years I do not recall to have killed a duck or a quail, and only half a dozen grouse for specimens. This uncollected increment, together with the proportion to which I shall be entitled in the future, I hereby bequeath to the bald eagle, the duck hawk, the prairie falcon and their kith and kin, in partial payment for the service that our fine raptors have rendered us economically and aesthetically.—A. BRAZIER HOWELL, *Department of Anatomy, Johns Hopkins Medical School, Baltimore, Maryland, February 5, 1930.*

Some Observations on Erythrocyte Count in Birds.—Some years ago while engaged on a study of the body temperatures of nestling altricial birds, the results of which are awaiting publication, I was struck with the evidences of a high metabolic rate in birds, such as the high temperature, fast respiration, and rapid cardiac rate. Such metabolic activity necessitates the supplying to the tissues of large quantities of oxygen. The red blood cells bearing hemoglobin are the only specific tissues differentiated for this purpose and it therefore became of interest to study briefly the number of cells and the hemoglobin content of the blood in birds.

The counting of blood cells has become a standardized procedure, simple in preparation and fairly accurate in skilled hands. It consists of drawing a column of blood into an accurately gauged pipette and diluting with normal salt solution to a 1-200 dilution. A drop of this dilution is expelled onto a hemacytometer ruled to measure exactly one millimeter square and 1/10 mm. deep, or in other words the contents measure 1/10 cubic millimeter in quantity. By means of further rulings within the chamber mathematical fractions of this quantity are obtained and the cells in this portion counted. The estimation of the number of cells per cubic millimeter of blood consists therefore of multiplying the number of cells counted by the necessary factors and the dilution. The estimation of hemoglobin content is done by means of comparison with a color scale.

On various field trips Mr. R. C. McGregor and I combined forces and armed with microscope, guns, and collecting equipment sallied into the jungle surrounded by a most omnipresent and noisy group of native children. Killed birds were retrieved immediately, the chest and heart opened and the blood pipetted out. The results were exactly nothing, since it was found that the clotting time of blood which in man averages three minutes, in birds is almost immediate. Fluid blood could not be withdrawn even from the chambers of the heart. Eventually it was found that blood could be used only from living birds and even this clotted in the pipette while the diluent was being added.

To correct this troublesome tendency of the blood to agglutinate and to clot, one percent of potassium citrate was added to the diluting fluid and this served as an anti-coagulant. The interior of the pipettes had to be moistened to prevent the formation of small clots in the bore.

Blood can be secured quite readily from the brachial vein at the bend of the elbow of the wing. The vein comes to the surface here, being covered only by a thin integument and lying alongside the tendon of the biceps. A fine needle thrust into the vein will produce a drop of blood which must be drawn into the pipette and diluted with great rapidity. The counting preferably should be done at once. No injury is sustained by the bird in this procedure and the pain is negligible or absent. It can be utilized in the case of trapped birds without fear of harm.

Since killed birds were of no use in this work and bird trapping was impossible it was necessary to secure market and caged birds. For this purpose permission was secured from the Director of the small Zoological Garden in Manila to get blood from the caged birds there. McGregor and I usually went together taking "Andy", the old and faithful taxidermist at the Bureau of Science, as interpreter. I have a keen recollection of the time that Andy had with a large Sea Eagle (*Cuncuma*) on its back which promptly sank its talons into my ankle and its beak into Andy's hand while a good portion of the native population of Manila crowded around the cage to watch Andy, the eagle and myself battle it out with considerable casualty on all sides.

The results of this brief investigation were so nearly uniform as to warrant the conclusion that the erythrocyte count in birds is approximately two and one-half million red cells per cubic millimeter of blood. This is about one-half the number found in man. On the other hand the hemoglobin readings were about 90 percent or equal to that of man. In other words the cells while fewer in number than in man are larger and carry more hemoglobin per cell. This was not the result expected. Evidently the needs for abundant oxygen are met by an increased speed in the circulation of the blood rather than by increasing the number of oxygen carrying elements in the blood.

The birds studied in this connection were as follows:

Platalea minor, Lesser Spoonbill, averaging	3,600,000 per cu. mm.
Platalea minor, two weeks later	1,800,000; this bird was ill and died shortly thereafter.
Nycticorax nycticorax, Night Heron	2,400,000 per cu. mm.
Ardeetta cinnamomea, Cinnamon Bittern	2,800,000 per cu. mm.
Sula leucogastra, Brown Booby	2,200,000 per cu. mm.
*Cathartes aura septentrionalis	2,600,000 per cu. mm.
*Bubo virginianus (pallascens?)	2,500,000 per cu. mm.
Cuncuma leucogaster, White-breasted Sea Eagle	2,600,000 per cu. mm.
Haliastur intermedius, Malayan Brahmany Kite	2,500,000 per cu. mm.
Passer montanus, Mountain Sparrow	2,500,000 per cu. mm.

*Studied in the United States.

—LEON L. GARDNER, *Camp John Hay, Mountain Province, P. I., November 20, 1929.*

Odd Bill Formation in a California Horned Lark.—A boy in my neighborhood brought to me on February 8, 1930, a California Horned Lark (*Otocoris alpestris actia*) which interested me immediately because of the strange shape of the bill, the upper mandible curving to such an extent as to suggest the hooked bill of a raptor. The length of the upper mandible in this specimen, which I have preserved as a skin, is 13.5 mm., and it extends in a curve downward 4 mm. beyond the tip of the lower mandible, which latter appears to be normal. (See fig. 57.) Both mandibles are stout and smooth with no irregularities except for shape. A possible explanation is a fracture of the upper mandible at some time in the bird's life, possibly as a nestling, resulting in this extension beyond the normal length.

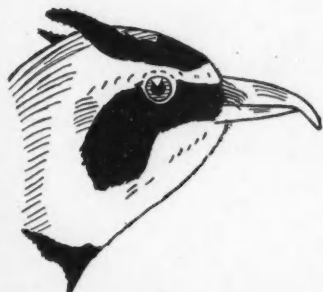


Fig. 57. HEAD OF CALIFORNIA HORNED LARK SHOWING ABNORMAL GROWTH OF ITS UPPER MANDIBLE.

It occurred to me before skinning it that the bird, which was a male, must have had difficulty in securing food. Skinning, however, showed the bird to be well developed, even having traces of fat. The stomach contents consisted entirely of fragments of small black

beetles.—EMERSON A. STONER, *Benicia, California, February 12, 1930.*

The Large-billed Sparrow at Salton Sea.—In a recent leaflet issued by the Audubon Society appeared a list of birds seen by a bird-study party at Salton Sea. Included among these was the Large-billed Sparrow. I discussed the matter with Mr. and Mrs. Ben L. Clary, of Coachella, who were members of the party. They both stated that they had seen the birds in question and, while unfamiliar with the species themselves, the identification had been made by Miss Mary Mann Miller.

The writer asked Mr. Clary to send a specimen to the Los Angeles Museum, which he very kindly did. The bird (no. 16913, coll. L.A.M.) is a female, taken by Ben L. Clary at Salton Sea, near Mecca, February 23, 1930. It is unquestionably *Passerculus rostratus rostratus*.

That this is a regular wintering ground for the species is, of course, not definitely proven. However, as the Audubon Society party noted them several days before Mr. Clary took the specimen, and as Mr. and Mrs. Clary have seen birds that they believe to be the same on different occasions during the winter months, it may develop that the Large-billed Sparrow winters regularly at Salton Sea.—G. WILLETT, Los Angeles Museum, February 27, 1930.

Blue-footed Booby on Salton Sea.—On November 1, 1929, there appeared on Salton Sea a bird unknown to the local residents. Snap shots made by Mr. Seth



Fig. 58. BLUE-FOOTED BOOBY (*Sula nebouxii*)
AT SALTON SEA, NEAR MECCA, CALIFORNIA,
NOVEMBER 1, 1929.

Hartley of the Salton Sea Salt Works were referred to me for identification. (See fig. 58.) Through the courtesy of Mr. George Willett of the Los Angeles Museum these were identified as "unquestionably the Blue-footed Booby (*Sula nebouxii*)."

Mr. Willett further states that "in the Condor (xxiv, 1922, p. 28) will be found a record of a booby probably of this species seen near Sunset Beach, Orange County, October 25, 1921. This is the only record for the state of California. The Blue-footed Booby breeds on islands in the Gulf of California so would not have far to go to get to Salton Sea."

In commenting on the peculiarities of this bird, Mr. Hartley says that it was utterly indifferent to man and apparently had no fear of anyone. Its system of fishing was to fly low over the water and as soon as it located its meal to fall head first after it into the water. Frequently it lit on the levees within a few feet of him, and on several occasions he was able to pick the bird up and carry it about. But if not in the mood for such demonstrations of affection, it did not hesitate to prod him with its long, sharp bill.

The residents of the vicinity developed quite an affection and admiration for their strange visitor because of its independence and indifference, and it was with regret that they noted its disappearance ten days later. With the opening of the hunting season at this time, either it was frightened away or was killed. The latter fate is suspected as the remains of a bird similar in appearance were found on the shore some weeks later.—MRS. BEN L. CLARY, Coral Reef Ranch, Coachella, California, March 6, 1930.

The Dotterel and other Birds from Cape Prince of Wales, Alaska.—The last collection of birds made by the representative of The Chicago Academy of Sciences at Cape Prince of Wales, Alaska, A. Nagozruk, during the summer of 1929, included several interesting specimens. Nagozruk was the field assistant of the undersigned during the spring of 1922, and since that time he has made valuable collections each season. The skins are first salted, and then are made into study material in the laboratory.

The present collection includes two specimens of the European Dotterel (*Eudromias morinellus*), which are the first records for continental North America. The Dotterel is included in the A. O. U. check-list on the basis of a single specimen taken on King Island, Bering Sea, July 23, 1897. Two other specimens for which I can find no Alaskan records are the Red-winged Blackbird (*Agelaius phoeniceus arctolegus*) and the Purple Martin (*Progne subis subis*). These birds were far from their beaten paths, and their occurrence at Wales seems more strange than that of the Dotterel. Swarth records a single Northern Red-wing from Kispiox Valley, northern British Columbia (Birds and Mammals of the Skeena River Region of Northern British Columbia, Univ. Calif. Publ. Zool., vol. 24, 1924, p. 348) which was, until the taking of the Wales specimen, "an extreme northwestern point of record for the species." If one cares to glance at a map, he will see that it is a long flight from Kispiox Valley to Cape Prince of Wales.

In addition to the above, there were three Golden Plovers (*Pluvialis dominicus dominicus*), all others I have seen from Cape Prince of Wales being *Pluvialis dominicus fulvus*. There were a Pallid Horned Lark (*Eremophila alpestris arctica*), a second record from Wales, a Scaup Duck (*Nyroca marila nearctica*), and an exceptionally fine plumaged Green-throated Loon (*Gavia viridigularis*). In years past, I have received several of the latter. The specimens, with their Chicago Academy of Sciences catalogue numbers, are as follows:

2228	Green-throated Loon	June 18, 1929
2237	Dotterel	June 15, 1929
2238	Dotterel	June 19, 1929
2239	Northern Red-wing	June 6, 1929
2240	Purple Martin	June 3, 1929
2241	Pallid Horned Lark	June 6, 1929
2245	Golden Plover	June 1, 1929
2246	Golden Plover	June 1, 1929
2247	Golden Plover	June 3, 1929
2289	Scaup Duck	June 25, 1929

I am indebted to Mr. Outram Bangs and Mr. James L. Peters for examining the above specimens and comparing them with specimens in the Museum of Comparative Zoology. In addition to the specimens listed, there were several Pintail Ducks and a Golden-eye which are being studied by Dr. H. C. Oberholser.—ALFRED M. BAILEY, Chicago Academy of Sciences, Chicago, Illinois, February 1, 1930.

New Records of Horned Larks from Southern California.—On December 21, 1927, Granville P. Ashcroft collected an adult female specimen of Merrill Horned Lark

(*Otocoris alpestris merrilli*), at Kane Springs, Imperial County, California; orig. no. 135, now no. 42004, collection of Louis B. Bishop.

On November 12, 1928, I secured, with a single shot, an adult male Merrill Horned Lark, orig. no. 281, now no. 43772, collection of Louis B. Bishop, and an adult male Saskatchewan Horned Lark (*Otocoris a. enthymia*), orig. no. 282, now no. 43771, collection of Louis B. Bishop; four miles southeast of Rosamond, Los Angeles County, California. I am indebted to Dr. Louis B. Bishop for the identifications of the specimens.—JACK C. VON BLOEKER, JR., *Los Angeles Museum, Exposition Park, Los Angeles, California, February 10, 1930.*

A New Race of Red-winged Blackbird from Costa Rica.—The identity of the red-winged blackbirds breeding in northwestern Costa Rica has always been a matter of uncertainty. Carriker (*Birds of Costa Rica*, 1910, p. 826) tentatively assigned them to *sonoriensis*, but only provisionally, for no females were then available. During the past year Mr. Austin Smith, the well known collector of Costa Rica birds, made a special effort to secure a representative lot of red-wings and as a result he sent to the Dickey collection at the California Institute of Technology a series of 15 skins consisting of 7 males, 6 females and 2 juveniles. In addition, the authorities of the Carnegie Museum courteously sent for examination the 7 males collected by Carriker in 1906. As might have been expected, these all prove to belong to an undescribed race, the most southerly of the forms of *Agelaius phoeniceus*. I therefore propose the name of

Agelaius phoeniceus costaricensis subsp. nov.

Type.—Female adult, no. 28893, collection of Donald R. Dickey; Bebedero, Guanacaste, Costa Rica; June 16, 1929; collected by Austin Smith.

Subspecific characters.—Most like *Agelaius phoeniceus grinnelli* A. B. Howell, of El Salvador, but wing and tail shorter; coloration of females darker brown above and more sooty (less grayish) on lower abdominal region and under tail coverts.

Range.—Fresh and tide water marshes about Bebedero near the head of the Gulf of Nicoya, northwestern Costa Rica.

Remarks.—Although in the coloration of the underparts there is very close similarity among the females of *sonoriensis*, *megapotaemus*, *grinnelli* and *costaricensis*, they may easily be segregated into two groups by the relative darkness of the upper parts. The paler-backed forms, *sonoriensis* and *megapotaemus*, are in turn readily separable one from the other by size, *sonoriensis* being decidedly the larger as well as slightly the paler of the two. The two members of the darker-backed group, *grinnelli* and *costaricensis*, are separable on the same basis, *grinnelli* being larger and slightly paler than *costaricensis*.

The differences between *grinnelli* and *costaricensis*, although obvious, are relatively slight, and were the distribution continuous there would be little point in recognizing two races. However, the two permanently resident colonies are separated from each other by some 300 miles and furthermore by the interposition of a third form having no very close resemblance to either.

		Breeding adult males					
	Wing	Tail	Culmen from base	Depth at base	Tarsus	Middle toe minus claw	
8	<i>grinnelli</i> 120.0-126.0 (123.6)	90.0-96.5 (92.7)	24.0-27.5 (25.4)	11.7-12.5 (12.2)	29.4-32.0 (31.0)	22.2-24.3 (23.2)	
14	<i>costaricensis</i> 114.0-122.5 (118.2)	85.0-94.5 (90.3)	23.0-26.3 (24.3)	11.6-12.7 (12.4)	30.1-31.8 (30.6)	21.1-23.0 (22.1)	
		Breeding adult females					
7	<i>grinnelli</i> 94.0-99.0 (95.6)	68.0-78.5 (71.5)	19.6-22.3 (21.3)	10.0-10.7 (10.3)	26.5-28.0 (27.5)	19.1-20.4 (19.5)	
5	<i>costaricensis</i> 90.0-92.5 (91.4)	62.0-70.0 (66.3)	19.3-21.0 (20.5)	9.8-10.5 (10.1)	25.6-26.9 (26.1)	18.4-20.0 (18.8)	

—A. J. VAN ROSSEM, *Pasadena, California, January 28, 1930.*

¹ Contribution from the California Institute of Technology.

Olives as Food for Robins and other Birds.—In my back yard is a tree bearing small olives, and during the fall and early winter these fell until the ground was black with them. About the first of February the Robins (*Turdus migratorius propinquus*) began gathering in and under the tree to eat the fruit. In a few days there was a large assemblage of birds about the place, and all day long they would stay near. At times as many as a hundred would be seen on the ground underneath the tree, with perhaps half as many perched in the tree. They ate the olives, sometimes appearing to swallow them whole, but at other times picking the flesh off the stones.

Other birds joined the Robins, especially the Golden-crowned Sparrows and Juncos, and occasionally a Steller Jay. In the middle of the day the ground, the tree, and surrounding bushes and trees, would be alive with a scolding, chirping mass of bird life. At one time I counted 150 Robins flying away from the olive tree and nearly as many perched about in other trees.

This unusual sight continued for about two weeks, until all the olives were cleaned up, and nothing left but bleaching stones. Then as suddenly as the birds had come, they disappeared. Now we see only an occasional Robin, as usual. Thinking that perhaps the hard freezing had made the fruit more palatable than usual, I tried it myself, but found it as bitter as ever.—HAROLD W. CLARK, *Angwin, California, March 3, 1930.*

The Status of *Lanius borealis* as a Species.—For a number of years, dating from the time of Audubon (Synopsis of the Birds of North America, 1839, p. 157), North American ornithologists have considered *Lanius borealis* Vieillot to be specifically distinct from *Lanius excubitor*, the Great Gray Shrike of Europe. However, Schiebel (Jour. f. Ornithologie, 54, 1906, p. 61), Hartert (Die Vögel der paläarktischen Fauna, 1, 1910, p. 423), and many other European writers have preferred to designate *borealis* as a subspecies of *L. excubitor*.

In reviewing this question I have endeavored to ascertain specific differences which might serve to separate *L. excubitor mollis* of eastern Siberia from the form *invictus* of Alaska. Pronounced vermiculations on the breast in adults and a white area on the lower eyelid seem to be the only supposed specific characters of *borealis* (and *invictus*) which merit special discussion. Characters such as color of upper parts, extent of basal white area on primaries, and white tipplings on rectrices and remiges are all of but subspecific value in the *Lanius excubitor* group as evinced by much individual variation and repeated instances of racial intergradation involving these characters. It should be recalled that *L. excubitor mollis* does not possess the basal white area on the secondaries that is present in *L. excubitor excubitor*.

Concerning vermiculation of the under parts, Hartert states (*loc. cit.*) that *mollis* is never devoid of at least some vermiculation. On the other hand, some specimens of *invictus* have the vermiculations greatly reduced, although never entirely absent. Consequently, there appears to be an intergradation as concerns this character between *mollis* and *invictus*, a fact pointed out by Hartert, although in connection with *borealis*, in as much as *invictus*, at the time of his writing, was not recognized as a valid race. Ridgway (Birds of North and Middle America, 3, 1904, p. 235) separated the Siberian bird from *borealis* on the basis of the white spot on the lower eyelid of the latter, as well as on the basis of differences in the vermiculation of the under parts. However, I find that in both *borealis* and *invictus* the presence of a white spot is variable, some birds lacking the spot except for one or two white feathers, whereas others have it well developed. Unfortunately, I have not been able to examine specimens of *mollis*, but instead, two adults, male and female, of *L. excubitor excubitor* from western Russia; and specimens of several other Old World races of the same species have been compared closely with *borealis* and *invictus*. Details of bill, foot, wing formula, etc., show close correspondence among birds of the two continents. In fact, closer similarity is to be noted in the shape of the bill of *excubitor* and *borealis* than is to be seen among the races of *L. ludovicianus*.

Consequently there is no valid reason for dissension from the usage of European ornithologists in the matter of extending *excubitor* to include the two American

rates *borealis* and *invictus*. Therefore, *borealis* and *invictus* should become *Lanius excubitor borealis* and *Lanius excubitor invictus*, and these names should be adopted in New World literature.—ALDEN H. MILLER, *Museum of Vertebrate Zoology, Berkeley, California, March 19, 1930.*

Whistling of Snipe.—In the Condor (xxvi, 1924, p. 175; xxix, 1927, p. 79; xxx, 1928, p. 128) are some interesting observations on the whistling of the Wilson Snipe, by Mr. Ralph Hoffmann, Mr. Aldo Leopold, and Mr. John Main, respectively. Mr. Hoffmann observed that the tail was spread during the dip and believed that to be the source of the sound, Mr. Leopold considers the whistling note is produced vocally, while Mr. Main from his observations believes it is produced by the wing or tail feathers.

In the marshes and paddy fields (fig. 59) of the Philippine Islands snipe occur in incredible numbers during the months from September to February, and an unparalleled opportunity for studying such birds is afforded. Four varieties are found.



Fig. 59. VIEW IN A SNIPE MARSH, PHILIPPINE ISLANDS.

Photo by Lt. F. Christian, U. S. A.

The most abundant is the Swinhoe Snipe (*Capella megala*), while the Pintail and Fantail snipe (*C. stenura* and *C. gallinago*) are less common. The Painted Snipe (*Rostratula capensis*) is a considerably different type of bird in which the female is more brightly colored than the male and is painted with white, olive green, and chestnut, and marked with ocellated ovate spots. This is a larger and slower flying bird than the Swinhoe, Pintail and Fantail snipe and does not resemble the Wilson Snipe closely as the latter three do.

On September 8, 1929, I went hunting in the marshes of Pangasinan Province, Luzon, and observed large numbers of snipe, mostly Swinhoe, making this whistling or, better, winnowing sound. These marshy plains stretch along the foot of the central Cordilleras of the Mountain Province and form vast stretches of muddy paddy fields and grass grown bogs, intersected with streams bordered with wild sugar cane, bamboo and heavy-foliaged trees. One is wading in water and gluey mud constantly and occasionally dodging truculent water buffalos that at times become very threatening and constitute a real menace.

It was during the typhoon season when a storm was brewing some distance away so that the weather was overcast, rainy, and squally, with occasional brisk showers. We were in the marshes by 7:00 a. m. Snipe in great numbers were

moving about the feeding grounds constantly. On all sides, high in the air, were singles and flocks of as many as twenty birds darting swiftly about to drop with crooked wing and lightning like dives into favored spots.

The winnowing note was made by snipe that were flying singly for the most part, and was produced as they dove downwards at great speed to rise again for another earthward plunge, and seldom as they dropped to feed. As I stood motionless one snipe dove directly on top of me and I was able distinctly to see a rapid vibration of the wings coincident with the production of the loud winnowing sounds. For several hours this was going on all over the marshes, until the heat of the day came on and the weather cleared. The purpose of the sound was not obvious. It did not seem to be an alarm or call note but rather in the nature of an acrobatic performance for the sheer delight of the motion and the sound.

Mr. Main correctly observed that the sound ended abruptly on the upward swing of the flight, which is good evidence that it is not a vocal sound. Brewster writing in Chapman's Handbook ascribes it to the rushing of air through the wings. Barrows, Michigan Bird Life, believes that the sound is made both by the wings and the voice and states that it is produced during the mating season.

I was not able definitely to determine the role of the tail in the sound production, but the observations of Mr. Hoffmann indicate that it is instrumental in this phenomenon. I do not believe that the voice takes any part in the production of the whistle but that it is made by the wings and, accepting Mr. Hoffmann's findings, the tail. One can not observe this phenomenon for many hours without being impressed with the fact that the dive is the all important element in the generation of the sound. Furthermore it is not necessarily a mating phenomenon since none of these snipe breeds in the Philippine Islands.

For those who do not believe in sight identification it may be added parenthetically that we brought home a large bag.—LEON L. GARDNER, *Camp John Hay, P. I., December 17, 1929.*

Winter Record for Long-billed Dowitchers in Suisun Marshes.—On December 18, 1929, Mr. P. A. Wetmore, manager of the Benicia Cannery, brought to me two Long-billed Dowitchers (*Limnodromus griseus scolopaceus*) which had been shot on that date by a hunter in Mr. Wetmore's party who mistook them for Wilson Snipe. These were taken on the grounds of a gun club located eight miles northeast of Benicia, near Cygnus. He reports that the flock consisted of some twenty birds which were flying overhead in a compact group. Both of the birds secured proved to be females.

On December 26, Mr. Wetmore located a flock of about ten of these birds feeding in the shallow water of a small pond in this same part of the Suisun marshes, and knowing that I was interested in securing the evidence to establish a winter record for this species in this section he secured another specimen. This was found to be a male.—EMERSON A. STONER, *Benicia, California, January 25, 1930.*

Utilization by Birds of Water in Hollow Trees.—Two Carolina Chickadees (*Parus carolinensis*) bathing in rain water standing in shallow hollows of trees in a small swamp near Pensacola, Florida, were observed by Gander on April 5, 1928. None of the hollows contained more than a teacup of water and the little birds splashed most of this out as they visited one tiny pool after another.

On January 5, 1929, at Monte Robles, near Ramona, San Diego County, California, the junior author watched a Shrike (*Lanius ludovicianus*) descend about five or six inches into a hollow in an oak to drink from a small quantity of water there. This was in a live oak whose trunk had divided some twelve or more inches above the ground, and one of these divisions had broken off, exposing a hollow which led down into the base of the tree. Through this hollow the bird descended to drink from the water accumulated at the bottom. On February 9, 1930, the same observer saw a Robin (*Turdus migratorius*) drinking from this hollow. On this date the water level was high enough so that the robin could reach it without entering the hollow.—FRANK F. GANDER and LEROY W. ARNOLD, *O'Rourke Zoological Institute, Balboa Park, San Diego, California, February 12, 1930.*

EDITORIAL NOTES AND NEWS

The Cooper Club membership list prepared by Mr. Harry Harris and published in the present issue of the Condor shows a total current enrollment of 869. This is good evidence of continued wide interest in the field of western ornithology. Also, this roster will doubtless find extensive use as a directory of active naturalists.

Further changes in the business management of the Cooper Ornithological Club and of the Condor are necessitated by growth. Mr. John McB. Robertson, Buena Park, California, takes over entire charge of our membership and subscription lists; hereafter all Club dues and subscriptions should be sent directly to him. Mr. W. Lee Chambers will now concern himself more with endowment affairs and investments, besides continuing to handle sale of back publications.

By the will of the late Mrs. Edward A. Kluegel (Belle Marsh Kluegel) the Cooper Ornithological Club receives \$500.00, bequeathed to it as an addition to the endowment fund. Increments of this character mean permanency in the Club's capacity to publish and thus distinctly encourage the Business Managers and the Editors. Mrs. Kluegel was a regular attendant upon Northern Division meetings for many years. While not an active participant in our programs, she evinced lively interest and her pleasant personality is lastingly remembered as making the occasions pleasurable. Her death took place at Carmel on the 28th day of May, 1928.

PUBLICATIONS REVIEWED

BATES ON THE BIRDS OF WEST AFRICA.—In our young days Timbuctu signified just about the farthest frontier in the vast unknown interior of the Dark Continent. Now, it appears, there is scarcely a geographical nook left unexplored anywhere in Africa, and much of it is easily accessible not only to the trader and farmer but, of late, to the tourist. An evidence that this last stage is now reached is before us in the shape of a well-gotten-up "Handbook of the Birds of West Africa" (London: John Bale, Sons and Danielsson, Ltd.; 30s net), by George

Latimer Bates, with illustrations by H. Grönvold; 1930 (our copy received January 27); pp. xxiv + 572, numerous uncolored illustrations. If you contemplate travelling through any of the region from Timbuctu south to the Gold Coast and from Senegal east to Lake Chad, and want to learn the birds along the way, take along a copy of Bates's Handbook. You will surely want to realize it when you find yourself within the range of the Bat-eating Buzzard, or of the Yellow-mantled Whydah-bird. You mustn't miss a chance of seeing the famous Black-throated Honey-guide, even though Mr. Bates declares that he personally knows no evidence supporting the tradition that honey-guides go about "of set purpose and intelligently, guiding people to places where honey is to be found!" Even to one who has no prospect ever of touring West Africa, the book in hand provides much natural history pleasant to read and obviously of sound authority.—J. GRINNELL.

WILLIAM ROWAN'S latest account of **EXPERIMENTS IN BIRD MIGRATION*** conducted at Edmonton, Alberta, presents a concrete type of data relating to the intricate problem of migration. Although the amount of literature on this subject is already most extensive, rarely are new facts, such as the data presented in this work, added to the common fund of knowledge. In a sense, Rowan's experiments are unique in that they seriously attempt to isolate and test single environmental factors and do not resort to the usual type of casual or even accidental observation. The author is well fitted to deal with migration by reason of his extensive experience among Canadian migrants, yet, at times he may be unduly influenced by the perfect and nearly universal migration of his local bird species. Were Rowan a Californian, for example, different emphasis might have been placed upon the vast number of birds which are resident or in which the migratory in-

*Experiments in Bird Migration. I. Manipulation of the Reproductive Cycle: Seasonal Histological Changes in the Gonads. By William Rowan. Proceedings of the Boston Society of Natural History, vol. 39, no. 5, October, 1929, pp. 151-208, plates 22-52.

instinct is poorly developed. It is well to recall that the majority of all known birds are in the non-migratory category.

The paper under consideration is largely a description of experiments and accompanying histological studies made on Juncos, and is designed better to establish theories of migration more fully argued in an earlier article (Rowan, W., Proc. Boston Soc. Nat. Hist., 38, no. 6, December, 1926, pp. 147-189). No attempt is made to deal with the originating causes or adaptive aspects of migration. He is concerned instead with the *modus operandi* of migration as it involves both extrinsic and intrinsic factors. However, a considerable antiquity is assumed for migration, an assumption perhaps not wholly justified for a bird such as the Junco of which the subspecies and local populations show wide variation in the migratory instinct, some in fact being entirely resident.

In brief, the experiments consist of subjecting Juncos and a few individuals of other species of small fringillids to either artificially increased or decreased length of day, all other known environmental factors of food, temperature, exposure, etc., being kept constant. A series of control birds was maintained. Variation of day length was produced both by electric light and by enforced activity without light. Numerous sample birds were killed at various times in order to make histological examinations of the gonads, and, to a limited extent, examinations of certain other endocrine tissues. Numbers of experimental and control birds were released and subsequent trapping conducted to determine whether or not the released birds migrated or at least departed from the immediate vicinity.

The essence of Rowan's conclusions are as follows: The north and south migrations of small fringillids and possibly of all birds are dependent upon the fall retrogression and spring recrudescence of the gonads. One of the important histological changes in the gonads at times of retrogression and recrudescence is the appearance of interstitial cells which presumably produce a hormone serving to instigate migration. The physiological rhythm of the gonads is timed and regulated by photoperiodism, or the effect of seasonal variation in length of day. Temperature and other weather conditions have either limited effect or have no effect on the gonad-migration rhythm,

photoperiodism being the important extrinsic factor. Increase and decrease in length of the daily period of physical activity is the important result of photoperiodism which effects gonad change. The length of the period of activity is of importance and probably not the intensity of the activity.

On the whole I am inclined to subscribe to Rowan's conclusions with certain limitations concerning their applicability, to be noted later. However, no matter how plausible his theories may be, I feel obliged to discuss points in his conclusions which in time doubtless will be proved true but which as yet are inadequately demonstrated by experimental results. The relation between the length of daily period of activity and gonad change is clearly demonstrated in the species studied. Also, the effect of day length on migration seems well proved for the Junco as a result of the observations made in connection with the release of experimental and control birds. On the other hand, the intensity of physical activity, regardless of its apparent lack of effect in Rowan's cage birds, may be of importance and thus, in some instances, may operate independently of day length in effecting either migration or gonad change. The production of the gonad rhythm in tropical species may be a case in point. However, there remains the weakest link in the conclusions, that of the control of migration through the gonads. It is possible that day length and consequent activity may effect gonad change and migration synchronously yet independently of one another, day length exciting migration through the nervous system or through the endocrine system other than the gonads. This alternative explanation of the experimental results seems not to be disproved so far as I can determine by any of the experimental data, even though Rowan's explanation is perhaps more plausible on theoretical grounds and on the basis of certain circumstantial evidence. The supposition that a hormone from the interstitial tissue of the gonads controls migration, probable as it may seem, is admittedly a matter of speculation on Rowan's part.

I feel that the problem of the mechanism of migration can not be as simple or as uniform among birds as the photoperiodism-gonad-migration explanation leads one to believe. Transequatorial and altitudinal migrations require modified or

entirely different explanations from that which applies to Juncos. It may be that the gonads and photoperiodism furnish only the initiating impulse and that the magnitude and especially the direction of migration are determined by other agencies.

The comment here offered aims not to detract from the striking and highly commendable work of Rowan. Questions are raised which doubtless are in process of solution at the present time by him. Rowan seems well on the way toward settling certain phases of the migration mechanism. Pending more elaborate confirmations, however, I feel that an over-enthusiastic acceptance of all points in Rowan's theories would lead to an attitude of uncritical satisfaction rather than to the best progress toward a complete understanding of migration.—ALDEN H. MILLER, *February 25, 1930.*

BERNHARD RENSCH ON RACE-GROUPS AND THE ORIGIN OF SPECIES.*—This volume must be approached with liberality of spirit. If the reader must assume a professionally defensive attitude, with one hand raised to set off the whole critical battery of his reference shelves, he may perhaps riddle the book at a hundred points, not one of which is likely to be vital. At the same time he may prove himself merely stiff-necked before some of the richest chapters of constructive criticism which have been printed in recent years.

Perhaps the chief trouble is that Rensch falls between two stools. He disclaims the intention of scholarly completeness, yet falls short of the ease and continuity of the scientific essay. Where he might follow the graceful sequences of Darwinian exposition, or the sincere simplicity of a Julian Huxley, he retains the jolting, subdivided, ugliness of the technical paper of the day, though without its pretense to mechanical completeness.

From an elaborate review and analysis of the geographic principle in modern systematics Rensch passes with almost naïve directness to the problem of the origin of species and the evidence for the direct influence of environmental changes, normally unaided by mutation, selection, or the indefinite factors of "orthogenesis."

The heart of the matter lies in the seventh chapter, which examines, and often,—perhaps suspiciously often,—sustains, such laws and such suggestions as serve to coordinate racial and environmental gradations. The total is imposing, and while it goes without saying that such an exposition, confined within 185 pages of text, can in strictness hardly win more than the verdict of "not proven," the array of evidence presented on such matters as progressive variation in size, proportion, and melanin quantity or quality, physiologic factors, sexual affinity and its relation to morphology, the relationships of laboratory and field genetics, and the histological basis of many phenomena, is sufficient to keep a good company of field, museum, and library naturalists employed for a generation, testing and checking one plausible and constructive hypothesis after another.

There is a suggestion that certain American sources have been treated rather casually. Those who are familiar with the array of modern critical paraphernalia which Dr. Linsdale has brought to bear on his races of *Passerella* will be amused to see his paper dismissed as "depending wholly on direct measurements, with no ratios." F. B. Sumner, who is drawn upon more extensively than any other American or Englishman, with J. A. Allen a close second, is apt to be "swallowed whole" with little regard even for his own reservations, as is the case with his experiments on temperature and hair-weight in mice. As may be inferred, the vast majority of sources, outside Rensch's personal investigation in Europe and the East Indies, are German. Two hundred and forty-eight titles are brought into play and assembled at last in an excellent bibliography of cited works.

On page 116 a section heading has been omitted. On page 82 the word "rassen" appears to have been used inadvertently in place of "arten."—T. T. MCCABE, *February 27, 1930.*

MANUAL FOR BIRD BANDERS.*—For ten years now, bird banding has been a major activity among the bird students of Canada and the United States. One group of birds after another has yielded to trap ingenuity, until today a surprisingly large

*Rensch, Bernhard: *Das Prinzip geographischer Rassenkreise und das Problem der Artbildung*. Berlin, Gebrüder Borntraeger, 1929: 8vo., pp. 4 + 206, 27 figs. in text.

*Manual for Bird Banders, by Frederick C. Lincoln and S. Prentiss Baldwin. Misc. Publ., U. S. Dept. Agr., no. 58, November, 1929, pp. 1-112, 70 text figs.

proportion of the species is being caught and banded.

To the keen leadership of S. Prentiss Baldwin and Frederick C. Lincoln, more than to any other factors, must we attribute the substantial advances in method and interest that have followed Mr. Baldwin's epochal revealment in 1919. And nothing they have done will, perhaps, be of greater value to ornithologists than their recent compendium under the title "Manual for Bird Banders".

Distributed by the Biological Survey in December, 1929, this comprehensive manual provides the banding contingent with detailed descriptions of 35 or more of the best bird traps so far devised, and adds all the information of one kind and another that one about to undertake banding activities would need, provided he is already familiar with the names of the birds. Under appropriate subtitles are described tools, baits, technique of operating traps, methods of holding birds, of attaching bands, of keeping records, and investigations that banders may undertake. Meticulous care has been given to the line drawings and the detailed descriptions, and where photographs are used most of them serve the purpose well. We note that the artist in drawing the Potter Trap (page 22) has placed the "trip-door-step" wrongly. This trap is only practical when the trip-door-step is given one-quarter turn to the left from the position in which it is shown. The lip of the gooseneck should stand at right angles to the wire of the door which it supports.

Throughout the manual the authors stress the importance of releasing banded birds unhandicapped by trap injuries, and many of the traps shown have been designed with this thought uppermost. Visiting traps "every hour or two" would better have been "every half hour or less", at least for some western stations where many species and individuals are present. Thrashers, towhees, quail, and molting birds require immediate release. We believe, too, that it is precarious to attempt to band most nestlings after their pin feathers begin to burst. But since, as the authors point out, "data obtained from birds banded as fledglings have certain obvious values that are not represented in the records of those fully adult at the time of banding", it is of the utmost importance that, wherever it can be safely done, nestlings be banded. The destruction of nestlings is a fertile field

for observation. How many people have actually seen cats and weasels follow human trails to nests? Is not most of our knowledge (?) on this subject presumptive? We have no check on the unfound nests destroyed by these animals, without the assistance of human trails. Snakes and jays deliberately hunt the trees over for nests. Why should not cats and weasels do the same? This point is emphasized, because, in the reviewer's opinion, neither observed mortality nor consequent waste of bands constitutes a valid reason for not banding all nestlings young enough to be willing to remain in the nest. The very fact that there is a larger mortality among young birds and fewer recoveries calls for increased banding of nestlings.

We are glad that the authors recommend trapping and banding troublesome predators and carrying them to a distance from the station for releasing. Aside from the fact that the distributional movements of predators are of as much interest scientifically and economically as are those of the birds they try to destroy, their function in Nature's scheme may well be that of eliminating sick and wounded individuals. Healthy birds when free seem to have little trouble escaping from the smaller hawks.

This manual comes appropriately at the end of a decade in which our thought has been occupied with methods of catching the birds. With a quantitative program assured, we can now turn to the qualitative effort which is bound to yield abundant dividends.—J. EUGENE LAW, *January 30, 1930.*

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

JANUARY.—The regular meeting of the Southern Division of the Cooper Ornithological Club was called to order at 8:15 p. m., January 28, 1930, by President Harry Harris at the Los Angeles Museum. In the absence of the regular secretary, Wright M. Pierce was appointed Secretary *pro tem*. The minutes of the December meeting were not read.

New names as follows were proposed for membership:

Jack D. Baker, 435 First St., Santa Rosa, Calif., Phillips Kloss, 3420 Webster St., Oakland, Calif., Frances H. Allen, 215 La Grange St., West Roxbury, Mass.,

Carey E. Gregory, Box 215, Morganton, N. C., Bertram William Cartwright, 392 Woodlawn St., St. James, Man., Canada, John T. Emlen, Jr., 36 West School Lane, Germantown, Phila., Pa., all by W. Lee Chambers; Laura Ethel Mills, Fallon, Nev., by Florence Merriam Bailey; E. W. Barton, Jr., R.F.D. 1, Box 1015, San Gabriel, Calif., by S. A. Watson; Berry Campbell, 138 N. Poppy St., Monrovia, Calif., by Raymond B. Cowles; Lydia Spencer Bowen, 841 Earlham St., Pasadena, Calif., by Hildegard Howard.

The following were nominated for officers in 1930: for President, George Willett; for Vice-President, J. R. Pemberton; for Secretary, Harold Michener. Since the above were the only nominees, these officers were, by simple procedure, elected for the current year. At this time Mr. Harris requested the newly elected President to take the chair.

The death of Mr. A. W. Hanaford, a Club member, was announced and the time of the funeral stated as 2:30 the following Thursday. It was regularly moved by Mr. Law, seconded by Mr. Reis, that the President appoint a committee to draw up a resolution of condolence for the Club, the same to appear on the minutes, and that a copy be sent to Mrs. Hanaford. Carried. The Chair appointed Mr. Harris and Mr. Law.

The President announced that plans for the Annual Meeting to be held in Los Angeles on April 11 and 12 were under way.

Dr. Bishop told of his experiences with Glaucous-winged Gulls on Bare Island, B. C., especially mentioning the white specimen of this gull that he saw there. Mr. Willett added that birds of this color among this species were quite rare. Perhaps one in a thousand are of this type.

Mr. Law gave an interesting account of his trip east this fall and told of meeting many of the prominent ornithologists while there, also of seeing the Snowy Owl and Purple Sandpiper on Cape Cod Bay. He also mentioned and told in detail of the feeding habits of a Sharp-shinned Hawk that he had held captive for several days.

Mr. Willett spoke of the occurrence of Spotted Towhees at Coachella, and Miss Vignos mentioned the capture of a white-tailed Gambel Sparrow at a banding station in the same locality.

The Chairman adjourned the meeting at 10 p. m.—WRIGHT M. PIERCE, *Secretary pro tem.*

FEBRUARY.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held on Tuesday evening, February 25, 1930, at the Los Angeles Museum, Exposition Park, Los Angeles, with about fifty members and friends present and President Willett in the chair. The minutes of the Southern Division January meeting were read and approved. The minutes of the January meeting of the Northern Division were read by title only.

The following applications for membership were read: Mr. C. L. Snyder, Fort Bayard, New Mexico, proposed by John McB. Robertson; Mr. Edward F. G. White, 185 Wurtemburg St., Ottawa, Canada, and Mr. Lincoln Bryant, Jr., 149 Randolph Ave., Milton, Mass., both proposed by W. Lee Chambers; and Mr. Sidney A. Liddell, R. R. No. 1, Summerland, British Columbia, Canada, proposed by Eric M. Tait.

Mr. Chambers announced that the Cooper Club had received its first bequest in the amount of \$500.00, from Mrs. Edward A. Kuegel, who had been a member of the Club residing at Carmel for a number of years. Dr. Bishop spoke of meeting Mrs. Kuegel at Carmel some years ago.

Mr. R. T. Woodlaw, of the Eastman Kodak Company, was the speaker of the evening. He showed many beautiful motion pictures, reproducing on the screen the natural color of the objects photographed. Some of these pictures were of the brightly colored foreign birds in the aviary on Catalina Island. Mr. Woodlaw explained the process by which these colored movies are made. Adjourned.—HAROLD MICHENER, *Secretary.*

NORTHERN DIVISION

JANUARY.—The January meeting of the Northern Division of the Cooper Ornithological Club was held on January 23, 1930, in Room 101, Zoology Building, University of California, at 8:00 p. m., with about eighty-five members and guests present. At the request of Vice-president Clabaugh, Mr. Joseph S. Dixon presided. Reading of minutes of both divisions was omitted.

Proposals for membership were: Daniel Axelrod, 3039 Seminary Ave., Oakland; Robert Delareuelle, 1136 East 33rd St., Oakland; Cranson Hopkins, 920 McKinley Ave., Oakland; Robert Taylor, 4030

Coolidge Ave., Oakland, by Brighton C. Cain; Chester W. Edge, R. R. No. 3, Box 21, Healdsburg, Calif., by J. Grinnell; Leslie Gilman Hawkins, 157 Frisbie St., Oakland, by L. Ph. Bolander; Curtis Hesse, Paleontology Dept., University of California, Berkeley, by Adrey E. Borell; Miss Barbara Norris, 2326 Warring St., Berkeley, by Miss Emily Smith; and Mr. Laurence Stevens, 918 East Haley St., Santa Barbara, by Henry W. Carriger.

At the invitation of the chair, Mr. James Moffitt read a letter which he had indited to Dr. John C. Phillips, outlining the present status of geese and ducks in California and stating his personal recommendations as to their future conservation. Because of Mr. Moffitt's deep interest in game birds and his intimate knowledge of their numbers and distribution in California he was requested to file a copy of his letter with the Chairman of the Conservation Committee of the Northern Division.

Mr. Brighton C. Cain reported that a count of votes taken in the campaign to determine the most popular candidate for State Bird of California has resulted in an overwhelming victory for the California Valley Quail, with a total of 100,000 votes in its favor. Mr. Cain spoke also of the meetings of the Audubon Association of the Pacific on the second Thursday evening of each month in the San Francisco Ferry Bldg., and invited Cooper Club members to attend.

Mr. Grinnell reported the receipt at the Museum of fragments of an Emperor Goose sent in from the Fall River High School. The bird had been found with other geese frozen in the ice on the Pit River. Mr. Moffitt stated that two Emperor Geese have just now been reported from Tomales Bay where they may be seen by observers. Mr. Leslie Hawkins told of seeing a Pigeon Hawk in pursuit of a Duck Hawk at Lake Lagunitas on January 11, and of the presence of Western Gnatcatchers near Lake Temescal; also of noting three male and four female American Mergansers near the Key Route mole on January 18. Mr. C. A. Bryant told of observing a male Wood Duck on Phoenix Lake on December 29.

The secretary read a letter from the nominating committee appointed by President Tyler at the December meeting and signed by the Chairman, Mr. Joseph Mailliard, offering the following nominations for officers of the Northern

Division for 1930: President, Mr. Tracy I. Storer; Vice-president, Mr. George M. Wright; Secretary, Mrs. Hilda W. Grinnell. Mr. Adrey Borell moved that the report be accepted and the secretary instructed to cast a ballot electing these persons. It was so voted.

Mr. H. S. Swarth then gave an illustrated talk upon "A Subarctic Summer," this being a report of four months spent enroute to, and at, Atlin, British Columbia. Mr. Swarth's talk was in the form of an interesting travelogue which divided matters ornithological quite evenly with the history of the country and the habits of the natives. He reminded his hearers that Atlin, while only 100 miles inland from Juneau, as the crow flies, has a very different avifauna, a large percentage of the birds being eastern forms such as the Golden-shafted Flicker, whereas on the coast the Red-shafted Flicker occurs.

Adjourned.—HILDA W. GRINNELL, Secretary.

FEBRUARY.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on February 27, 1930, at 8:00 p. m., in Room 101, Zoology Building, University of California, Berkeley, with Mr. Storer presiding. About 140 members and guests were present.

Reading of the minutes of both divisions was omitted. Miss Alice J. Swasey, 2626 Benvenue Avenue, Berkeley, was proposed for membership by Miss Margaret W. Wythe. Mr. Taylor of Atlin, B. C., was present and showed some beautiful photographs of the region which was the subject of Mr. Swarth's talk in January.

A list of birds seen in Mosswood Park, Oakland, was presented by Marshall Jencks and Phillips Kloss. Mr. Leslie Hawkins reported many occurrences of interest; and Mr. Laurence Huey, of San Diego, reported, with visitor's luck, having seen two Prairie Falcons chasing pigeons about the top of the University Campanile.

The evening's talk was by Mr. Thomas T. McCabe, of Barkerville, British Columbia, upon "The Cariboo Mountains of British Columbia." The lay of the land, the habits of moose, caribou and the lesser mammals, learned during a sojourn of eight summers and five winters, were spoken of, as well as the birds of the region. Mr. McCabe's lecture together

with a fascinating series of slides thrown on the screen by Mrs. McCabe made us all wonder why the rush to Barkerville stopped in '59 when gold gave out!

Adjourned.—HILDA W. GRINNELL, Secretary.

FIFTH ANNUAL MEETING.—The Fifth Annual Meeting of the Cooper Ornithological Club was held at Los Angeles, Friday and Saturday, April 11 and 12, 1930. The session was opened in the Los Angeles Museum by George Willett, President of the Southern Division. Dr. W. A. Bryan, Director of the Los Angeles Museum, extended greetings from the Museum to the Club and its members. He pointed out that the Cooper Ornithological Club was one of the organizations vitally concerned in the establishment of the Museum. President L. H. Miller of the Board of Governors replied to Director Bryan's welcome and offered congratulations on the splendid recent development of the Museum. Dr. Barton Warren Evermann was then called to preside.

H. S. Swarth described "A Northern Summer", a travelogue of his 1929 expedition to Atlin, British Columbia. By word and lantern slide he portrayed the local conditions rather fully and touched briefly on the local distribution of birds in the region. Mrs. M. E. McLellan Davidson gave "A Samoan Malanga", an illustrated account of a recent trip to Samoa, with mention of a few birds. "The New Check-list" was discussed by L. B. Bishop, and some of the difficulties in the statement of ranges and concerning acceptance and rejection of subspecies were touched upon. Excerpts from a letter by Witmer Stone on difficulties of the revision committee were read.

The session adjourned and lunch was had at a nearby restaurant where the visitors were guests of the southern members. Upon reconvening, at 1:30 p. m., S. G. Jewett presided. "The A.O.U. Check-list" provided for further discussion by Joseph Grinnell, now president of the A.O.U. and member of the committee concerned with the check-list revision. "Mutation in the Varied Thrush", as suggested by a specimen lacking the red coloration, was dealt with by J. E. Law. Factors involved in differential distribution of melanin and lipochrome pigments were touched upon. "Fossil Birds from Conklin Cavern, New Mexico", were described by Hildegard Howard (Mrs.

Henry) Wylde. Of twenty-seven species recorded, the raptorial forms are predominant, with gallinaceous species next in numbers. The fauna is Pleistocene presumably, and does not indicate any climatic changes from that obtaining in the region at the present time. Fifteen millimeters of a foot bone afforded discussion of "A Pliocene Goose from Ricardo" by L. H. Miller. This carries the geese to a total of six fossil species in the genus *Branta*. The genus in both past and present time has exhibited a variety of sizes. The mammalian fauna of the Ricardo Pliocene suggests grazing conditions with broad-leaved trees in nearby areas and thus was probably suited for occupation by geese such as obtains in the moister portions of interior California at the present time. "Systematics of some Western Birds", presented by Joseph Grinnell, involved a plea for more and more careful systematic study of western species and subspecies and suggested the need for additional workers in this field. *Picoides a. tenuirostris* is too slightly differentiated for separation in the Sierra Nevada; the Lead-colored and Coast bush-tits prove, on the basis of material from eastern California, to be but subspecies of one species. The "Development and Behavior of Young Golden Eagles" as studied by E. L. Sumner, was discussed and illustrated in an excellent series of studies on young birds near Claremont, California.

About 60 persons were in attendance at the morning and afternoon sessions.

In the evening the guests were entertained in a party at the Biltmore Theatre, where movietone films by Mr. and Mrs. Martin Johnson were shown.

The sessions on Saturday were held on the new Westwood Campus of the University of California at Los Angeles, in Room 29 of the Physics-Biology Building. In the name of the Director, L. H. Miller extended a greeting and welcome to the new headquarters of the University, and then took the chair for the morning session. "Field Observations on the Osprey", an excellently illustrated study by Miss Caroline P. Canby, of the bird at Eagle Lake and on the coast of Maine, was presented showing the manner of nesting, types of sites chosen, habits of the birds, and growth of the young. "The Status of Some Alaskan Birds", discussed by George Willett, was a critical study based on his long residence in Alaska and first-hand information on the avifauna,

and included discussion of the Kittiwake, White-cheeked Goose, Sooty Grouse, Bald Eagle, Raven, Crow, Hairy and Downy woodpeckers, Crossbill, and Robin. Discussion of the eagle situation in Alaska brought the statement from Mr. Willett that he had seen 47 Bald Eagles in one tree and 700 along five miles of beach, and had found bones of deer fawns in nests, and fawn hair on claws of eagles. Alaska, as a frontier country, forces some of the inhabitants to depend upon game for meat, and the eagles in exceeding abundance are a competing factor. Mr. Willett expressed the opinion that the eagle is not in any danger of extermination in Alaska. "Some African Notes", by R. B. Cowles, involved a comparison of some families of South African birds with local families in western America, and discussion of feeding habits, especially as related to termites. "Twenty-five Minutes in the Life of a *Selasphorus* Hummingbird", by T. I. Storer, presented a record of the activities of a single individual in Humboldt County, while defending its forage range on a late summer afternoon. The following papers were read by title: "The Ravens of the State of Washington", by J. H. Bowles, and "Notes on the Nomenclature of North American Shrikes", by A. H. Miller. About 50 persons were present.

After luncheon at the Y. W. C. A. building, the session reconvened with T. I. Storer as chairman. The relations between "Birds and Eucalyptus Trees" were discussed and illustrated by J. McB. Robertson, who showed the facilities afforded many native species, by the planting and growth of eucalyptus trees. Under the simple title "Notes from Oregon" S. G. Jewett gave an excellent resumé of the zonal distribution of birds in the state of Oregon and made comments on the relative population of certain species. "Photographs of Alberta Birds" were presented by S. S. Stansell, with running comments. Mrs. F. T. Bicknell reported upon "The California State Bird Campaign". The campaign opened formally with an announcement in the November-December, 1927, Condor. Twenty-two bird candidates were selected for the balloting, which extended from February 3, 1928, to December 31, 1929. A total of 135,600 votes included 61,559 for the California Quail, 18,966 for the Bluebird, and 12,776 for the Bullock Oriole. The campaign cost \$511.64, of which \$134.09 for postage was

borne by the chairman, Mrs. Bicknell, and 28,895 pieces of literature were distributed by her. California is the nineteenth state to select a state bird. The following papers were read by title: "The Farm Game Problem" by Mrs. A. J. French, "Field Notes on the Geese of Central California" by James Moffitt, and "The Problem of Damage to Agriculture in California by Birds" by Stanley E. Piper. About 70 persons were present.

In the evening the Annual Dinner, with 79 persons in attendance, was held at the "Mary Louise", West 7th at Lake. L. H. Miller was toastmaster and many of those present responded to his witty solicitations for comments on matters ornithological.—TRACY I. STORER, *Secretary*.

BOARD OF GOVERNORS.—The ninth annual meeting of the Board of Governors of the Cooper Ornithological Club was held at Hollywood, California, on April 13, 1930. The members gathered at breakfast as guests of Dr. and Mrs. Guy C. Rich at their residence, 1820 El Cerrito Place. At 10:30 a. m. President Miller called the meeting to order with the following members present: Mrs. H. W. Grinnell, Messrs. J. S. Appleton, L. B. Bishop, W. L. Chambers, Joseph Dixon, B. W. Evermann, J. Grinnell, C. B. Las-treto, J. E. Law, Joseph Mailliard, Harold Michener, W. M. Pierce, G. C. Rich, Howard Robertson, J. McB. Robertson, T. I. Storer, George Willett and George M. Wright. J. G. Taylor was also present for a brief period. By invitation S. G. Jewett sat with the Board. The following members were represented by proxies: Donald R. Dickey by W. L. Chambers; W. K. Fisher and F. N. Bassett by Joseph Grinnell; Ralph Arnold, J. G. Tyler, H. S. Swarth, H. C. Bryant and G. F. Morcom by L. H. Miller; Amelia S. Allen, H. W. Carriger and J. S. Cooper by T. I. Storer.

Minutes of the eighth annual meeting were read and approved.

Those present signed a letter of greeting and good cheer for our fellow-member, Mrs. Amelia S. Allen, who is recovering slowly from injuries received in an accident last winter.

The report of the Business Managers, in the form of an audit of the Club's accounts by Waldrof J. Boland, was presented, commented upon by J. E. Law and W. L. Chambers, and accepted by unanimous vote.

A letter was read from the Secretary of the Seventh International Ornithological Congress inviting the Club to designate a Committee of Delegates. The President was empowered to appoint delegates. Mr. H. Van Straaten, H. S. Swarth, Alexander Wetmore and Casey A. Wood were designated.

Matters of editorial policy and action were presented by Joseph Grinnell. Four major items were commented upon and received attention of the Board, as follows:

1. The Mailliard Prize in Ornithology, offered by Joseph Mailliard, evoked a considerable amount of interest. From fifteen articles meeting the conditions, that by J. M. Edson which is appearing in the current issue of *The Condor* has been awarded the prize.

2. *The Condor* has been criticised for not offering a greater amount of more popular material. The editorial policy has been to print only those offerings which make sound additions to ornithological knowledge, eliminating mere duplications and items which afford nothing more than easy reading. The Board voted an expression of satisfaction with the present character of *The Condor* and approved the current policy of the editors.

3. A request for volunteers to compile the third ten-year index to *The Condor* was responded to by Messrs. Griffing Bancroft, L. P. Bolander, M. P. Skinner and George Willett. The last named was selected and has completed the index of 400 typewritten pages, ready for the printer. Authorization for publication of the index as a Pacific Coast Avifauna was given, and a vote of thanks was tendered George Willett for his services to the Club.

4. The biennial roster, now appearing with separate lists for honorary, life and active members, has been criticised as to form. It was decided to resolve the roster into two lists, one for honorary members, the other for all others, with suitable designation of life members.

Joseph Dixon then reported as Club representative on the council of the Associated Sportsmen's Clubs. Some progress has been made, though consistent and well-balanced action is difficult to achieve. The Board voted to continue Joseph Dixon as its representative in this position.

Discussion of incorporation proceedings was initiated by Howard Robertson, followed by J. E. Law and others. Completion was urged by all present. A motion

was passed, reappointing the President, Secretary and Howard Robertson as a special committee to continue activity. Upon receipt of corrections from D. R. Dickey, early completion was urged, and the President was given power to discharge the original incorporation committee.

A rising vote of thanks was tendered Dr. and Mrs. Rich for their hospitality to the Board.

Under new business, J. E. Law discussed tendencies in Club activities. Originally, collecting of eggs and skins was a prime topic of discussion; later, recording of natural (life) history data became an important objective; at present a very great breadth of subjects is being covered, some having but minor relation to ornithology. Chairman Miller stated that all members should assist in the production and promotion of real scientific work. Several members commented on difficulties in obtaining topics. George Willett pointed out that the persons who attend Division meetings regularly, but who do not participate in programs, represent a type of member constituting a certain part of the Club membership and responsive to the present variety in programs.

The matter of legal designation of the California Quail as the state bird was discussed. The President suggested that members might volunteer for service in advancing the matter. C. B. Lastreto thought that the Club should endorse it. The Board of Governors, on behalf of the Club then unanimously voted to endorse the action of the California Audubon Society and the Audubon Association of the Pacific in their efforts which led to selecting the California Quail as the state bird. The Board members discussed generally the matter of encouraging younger students in ornithology.

Upon motion of W. L. Chambers, seconded by George Willett, duly passed, the Secretary cast a ballot re-electing the present officers, with the exception that J. McB. Robertson replaces Harry Harris as one of the Business Managers. The officers for the ensuing year are: Board of Governors: President, L. H. Miller; Vice-President, Joseph Mailliard; Secretary, T. I. Storer. Editor, J. Grinnell; Associate Editor, J. M. Linsdale; Business Managers, W. L. Chambers and J. McB. Robertson.

Adjourned, 1:25 p. m. — TRACY I. STORER, Secretary.

**OFFICERS, HONORARY MEMBERS,
LIFE MEMBERS, AND ACTIVE
MEMBERS OF THE COOPER
ORNITHOLOGICAL CLUB**

Revised to April 15, 1930

OFFICERS

BOARD OF GOVERNORS

Loye H. Miller, President	
Tracy I. Storer, Permanent Secretary	
Amelia S. Allen	W. B. Judson
J. S. Appleton	C. B. Lastreto
Ralph Arnold	J. Eugene Law
F. N. Bassett	Joseph Mailliard
Louis B. Bishop	Harold Michener
Harold C. Bryant	G. Frean Morcom
H. W. Carriger	Wilfred H. Osgood
W. Lee Chambers	J. R. Pemberton
Herbert L. Coggins	Wright M. Pierce
J. S. Cooper	Guy C. Rich
Donald R. Dickey	Howard Robertson
Joseph S. Dixon	Harry S. Swarth
Walter K. Fisher	George Willett
Hilda Wood Grinnell	Curtis Wright
Joseph Grinnell	George M. Wright
Harry Harris	
Barton Warren Evermann	

EDITORIAL STAFF

Joseph Grinnell, Editor
Jean M. Linsdale, Associate Editor

BUSINESS MANAGERS

W. Lee Chambers
John McB. Robertson

NORTHERN DIVISION

Tracy I. Storer, President
George M. Wright, Vice-President
Hilda Wood Grinnell, Secretary

SOUTHERN DIVISION

George Willett, President
John R. Pemberton, Vice-President
Harold Michener, Secretary

MEMBERSHIP DIRECTORY

Year following address indicates date of election to membership. Year in parenthesis indicates date of advancement to Honorary or Life Membership.

HONORARY MEMBERS

- * Life Honorary Member
- **Contributor to Endowment Fund
- ‡Contributor to Subsidy

- * **Bailey, Florence M. (Mrs. Vernon), 1834 Kalorama Road, Washington, D. C., 1910 (1920) (1920).
- Evermann, Dr. Barton Warren, Calif. Academy of Sciences, Golden Gate Park, San Francisco, Calif. 1911 (1926).
- Fisher, Dr. A. K., Biological Survey, Washington, D. C. 1904 (1924).
- * **Law, J. Eugene, Altadena, Calif. 1900 (1915) (1929).

- * **§Mailliard, Joseph, 1815 Vallejo St., San Francisco, Calif. 1895 (1920) (1924).
- Merriam, Dr. C. Hart, 1919 16th St., Washington, D. C. 1909.
- * **Morcom, G. Frean, 243 N. Coronado St., Los Angeles, Calif. 1904 (1915) (1922).
- Nelson, Dr. Edward W., Biological Survey, Washington, D. C. 1904 (1917).
- * **Palmer, Dr. Theodore S., 1939 Biltmore St., N. W., Washington, D. C. 1903 (1920) (1929).
- * **Stephens, Frank, Natural History Museum, Balboa Park, San Diego, Calif. 1894 (1912).

ACTIVE MEMBERS

- *Contributor to Endowment Fund
- **Contributor to Subsidy
- [L.] = Life Member

A

- Abbott, Charles H., 28 S. University St., Redlands, Calif. 1928.
- * **Abbott, Clinton G., Nat. Hist. Museum, Balboa Park, San Diego, Calif. 1921.
- Abbott, Jacob Bates, 2491 Country Club Drive, Altadena, Calif. 1930.
- Adams, Benjamin, Weathersfield, Conn. 1920.
- Adams, Miss Romola M., 912 Linden Ave., Long Beach, Calif. 1921.
- Albro, Miss Mary Stephanie, 51 Canyon Road, Berkeley, Calif. 1927.
- Alexander, Miss Annie M., The Regillus, 19th and Jackson Sts., Oakland, Calif. 1908 (1923). [L.]
- Alexander, Miss Mary C., 2570 Cedar St., Berkeley, Calif. 1927.
- Allen, Mrs. Amelia S., 37 Mosswood Road, Berkeley, Calif. 1913.
- Allen, Dr. Arthur A., McGraw Hall, Ithaca, N. Y. 1911.
- Allen, Francis H., 215 LaGrange St., West Roxbury, Mass. 1930.
- Allen, Dr. Glover M., Museum of Comparative Zoology, Cambridge, Mass. 1925.
- Allen, Walter I., 2057 Pepper Drive, Altadena, Calif. 1922.
- Anderson, Edwin C., Dill Rapids, So. Dakota. 1925.
- Anderson, Dr. Rudolph M., Biol. Div. National Museum of Canada, Ottawa, Ontario, Canada. 1916.
- Andrews, Arthur Allen, 28 Dugan St., Canandaigua, N. Y. 1927.
- Anthony, A. W., 3947 Center St., San Diego, Calif. 1921.
- Applegate, Elmer I., Box 236, Klamath Falls, Ore. 1921.
- Appleton, J. S., 1332 N. Citrus Ave., Hollywood, Calif. 1901 (1919). [L.]
- Archilles, Mrs. Gertrude Strong, Fountain Oaks, Morgan Hill, Calif. 1925.
- Armstrong, Edward E., 2249 Calumet Ave., Chicago, Ill. 1914.
- Arnold, Benjamin Walworth, 465 State St., Albany, N. Y. 1927.

- Arnold, Jack, 2525 N. McCall Ave., Selma, Calif. 1930.
- Arnold, Leroy W., 3445 Park Blvd., San Diego, Calif. 1929.
- Arnold, Mrs. Lewis, Apt. 7A, 2100 Virginia St., Berkeley, Calif. 1921.
- Arnold, Dr. Ralph, 812 Subway Terminal Bldg., Los Angeles, Calif. 1893.
- Ashcroft, Granville Plumber, 6516 Hubbard St., Culver City, Calif. 1927.
- Atkinson, Dr. Spencer R., Pacific Southwest Bank Bldg., Pasadena, Calif. 1925.
- Atkinson, W. L., 1735 The Alameda, San Jose, Calif. 1901.
- Atsatt, Miss Sarah R., 345 S. Serrano Ave., Los Angeles, Calif. 1911.
- Atwell, George Dudley, 2806 Summer St., Eureka, Calif. 1926.
- Averill, Charles Ketchum, 1075 Iranistan Ave., Bridgeport, Conn. 1922.
- Avis, Walter M., 129 S. Thomas St., Pomona, Calif. 1929.
- Axelrod, Daniel, 3039 Seminary Ave., Oakland, Calif. 1930.
- B**
- Badè, Dr. Wm. F., 2616 College Ave., Berkeley, Calif. 1903.
- Badger, M. C., Santa Paula, Calif. 1915.
- Bailey, Alfred M., Chicago Academy Sciences, Lincoln Park, Chicago, Ill. 1917.
- Bailey, Bernard, San Marcos, Calif. 1911.
- Bailey, H. H., 206 Exchange Bldg., Miami, Florida. 1903.
- Bailey, Vernon, 1834 Kalorama Road, Washington, D. C. 1904.
- Baker, Jack D., 435 First St., Santa Rosa, Calif. 1930.
- Baker, John H., 1165 Fifth Ave., New York, N. Y. 1930.
- *Baldwin, S. Prentiss, 11025 East Blvd., Cleveland, Ohio. 1920 (1920). [L.]
- *Bales, Dr. B. R., 149 W. Main St., Circleville, Ohio. 1906.
- Ball, Wm. Howard, 1861 Ingleside Terrace, Washington, D. C. 1926.
- Ballard, Mrs. Maria V., 1917 Baker St., San Francisco, Calif. 1919.
- Bamford, Mrs. G. L., 1428 Castro St., Oakland, Calif. 1918.
- **Bancroft, Griffing, 2525 First St., San Diego, Calif. 1920.
- Bancroft, Griffing, Jr., 5639 University Ave., Chicago, Ill. 1926.
- *Bangs, Outram, Museum Comparative Zoology, Cambridge, Mass. 1906.
- Barker, Fred, Parkers Prairie, Miss. 1914.
- Barnes, C. A., 1815 S. Western Ave., Los Angeles, Calif. 1921.
- Barnes, Claude T., 359 10th Ave., Salt Lake City, Utah. 1915.
- *Barnes, R. Magoon, Lacon, Ill. 1908 (1921). [L.]
- Barton, E. W., Jr., R.D. 1, Box 1015, San Gabriel, Calif. 1930.
- Bartram, John, R.R. 2, West Chester, Penn. 1926.
- Basner, Harry, 440 Broadway, New York, N. Y. 1930.
- Bassett, Frank N., 91 Merced Ave., San Francisco, Calif. 1919.
- Bastin, Miss Catharine S., 1207 Bonita Ave., Berkeley, Calif. 1926.
- Batchelder, Chas. F., 7 Kirkland St., Cambridge, Mass. 1910.
- Bates, Miss Josephine J., 1267 Sunset Ave., Pasadena, Calif. 1921.
- Bates, Lana Louise, P. O. Box 234, Los Banos, Calif. 1930.
- Battles, Carroll David, 2347 S. Highland Ave., Los Angeles, Calif. 1924.
- Baynard, Oscar E., Box 104, Plant City, Florida. 1924.
- Beadel, Henry Ludlow, R.F.D. A, Tallahassee, Florida. 1927.
- *Beck, Rollo H., Planada, Merced Co., Calif. 1894 (1919). [L.]
- Beebe, William, 33 West 67th St., New York, N. Y. 1926.
- Bell, Mrs. Chas. C., Saratoga, Calif. 1928.
- Benjamin, Elbert, 818 Union League Bldg., Los Angeles, Calif. 1920.
- Bennet, Miss Eleanor V. V., 2525 Webster St., Berkeley, Calif. 1920.
- Benson, Direk, P. O. Box 98, Ukiah, Calif. 1929.
- Benson, George, Voltage, Harney County, Oregon. 1926.
- Benson, Seth Bertram, Museum Vertebrate Zoology, Berkeley, Calif. 1927.
- *Bent, A. C., 140 High St., Taunton, Mass. 1909 (1922). [L.]
- Bergtold, Dr. W. H., 1159 Race St., Denver, Colo. 1917.
- Betterley, Bertram O., 2005 2nd St., Eureka, Calif. 1922.
- Bickford, E. L., First Natl. Bank, Napa, Calif. 1927.
- Bicknell, Mrs. F. T., 319 S. Normandie Ave., Los Angeles, Calif. 1913.
- Bigelow, Homer L., 37 Old Orchard Road, Chestnut Hill, Mass. 1910.
- Birkhead, Robert H., 1115 Kilson Drive, Santa Ana, Calif. 1928.
- **Bishop, Dr. Louis B., 450 S. Bradford St., Pasadena, Calif. 1904 (1920). [L.]
- Blackwelder, Miss Martha Jean, Box NN, Stanford University, Calif. 1925.
- Blain, Dr. Alexander W., 2201 Jefferson Ave., Detroit, Mich. 1926.
- Blake, Mrs. Edwin T., Arlington Ave. and Rincon Road, Berkeley, Calif. 1917.
- Blanchard, Miss Barbara D., 1524 A, Oxford St., Berkeley, Calif. 1930.
- Blayne, Miss Nita A., 920 O St., Fresno, Calif. 1911.
- Blickensderfer, Clark, 850 Grant St., Denver, Colo. 1922.
- Bliss, John D., Pozo, San Luis Obispo Co., Calif. 1916.
- Bogle, Mrs. Sara S., 2951 Linden Ave., Berkeley, Calif. 1922.

- Bolander, L. Ph., 435 Vernon St., Oakland, Calif. 1907.
- Bolt, Benj. F., 225 East 46th St., Kansas City, Mo. 1916.
- Book, Miss Lois Adelaide, 733 Franklin St., Columbus, Indiana. 1930.
- Booth, Edward J., 2805 Elm St., Bellingham, Wash. 1926.
- Boothby, Guy E., 904 Pomona Ave., Coronado, Calif. 1929.
- Borell, Adrey E., 753 Fifty-sixth St., Oakland, Calif. 1918.
- Bossler, John, Hamberg, Berks Co., Penn. 1927.
- Bowdish, B. S., Demarest, N. J. 1910.
- Bowen, Miss Lydia Spencer, 841 Earlham St., Pasadena, Calif. 1930.
- Bowles, J. Hooper, Berg Apts., Tacoma, Wash. 1903.
- Boyle, Ashby D., 380 E St., Salt Lake City, Utah.
- Bracelin, Mrs. H. P., 2214 Vine St., Berkeley, Calif. 1930.
- Bradford, Chas. H., 852 E. 5th St., Pomona, Calif. 1925.
- Bradshaw, Fred, Director Provincial Museum, Normal School, Regina, Sask., Canada. 1929.
- Braily, J. C., 501 Burnside St., Portland, Oregon. 1926.
- Bramkamp, Richard, Banning, Calif. 1921.
- Brandreth, Courteney, Ossining, New York. 1925.
- Brandt, H. W., 14507 Shaker Blvd., Cleveland, Ohio. 1914.
- Bremer, Bernhard Charles, 516 Battery St., San Francisco, Calif. 1925.
- Bretsch, Clarence, 690 Broadway, Gary, Indiana. 1926.
- **Brooks, Major Allan, Okanagan Landing, B. C. Canada. 1906 (1920). [L.]
- Brooks, Prof. Sumner C., Dept. Zool., Univ. Calif., Berkeley, Calif. 1928.
- Brooks, Winthrop Sprague, 234 Berkeley St., Boston, Mass. 1923.
- Broomhall, W. H., Stockport, Ohio. 1927.
- Brown, Edward J., 3722 Cornelia Drive., Coconut Grove, Miami, Fla. 1915 (1919). [L.]
- Brown, Mrs. Herbert, 434 E. 2nd St., Tucson, Ariz. 1914.
- Brown, Miss Nellie May, 169 N. Griswold St., Box 489, Tujunga, Calif. 1922.
- Brown, W. W., Box 2283, St. Petersburg, Florida. 1930.
- Bruner, Stephen C., 17th No. 421, Habana, Cuba. 1925.
- Bruun, Charles A., 1510 Central Ave., Hot Springs, Arkansas. 1925.
- Bryan, Wm. A., Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1921.
- Bryant, Chas. A., 150 Franklin St., San Francisco, Calif. 1922.
- Bryant, Dr. Harold C., Calif. Fish and Game Division, Russ Bldg., San Francisco, Calif. 1910 (1920). [L.]
- Bryant, Lincoln, Jr., 149 Randolph Ave., Milton, Mass.
- Bryens, Oscar McKinley, McMillan, Luce Co., Mich. 1927.
- Buckman, George, 1669 Oxford St., Berkeley, Calif. 1927.
- Buhn, Mrs. Minnie, 3027 60th Ave., Oakland, Calif. 1921.
- Bull, Dr. Edward C., 500 S. Hill Ave., Pasadena, Calif. 1926.
- Bunker, Charles D., Nat. Hist. Museum, State Univ., Lawrence, Kansas. 1928.
- Bunker, Paul F., 1544 Spruce St., Berkeley, Calif. 1922.
- Burgess, Miss Dorothy, 220 South J St., Madera, Calif. 1929.
- Burk, Miss Genevieve S., 726 Sutter St., San Francisco, Calif. 1925.
- Burleigh, Thomas D., 612 City Hall, Ashville, N. C. 1918.
- Burnell, Miss Elizabeth, 1029 N. Stanley Ave., Los Angeles, Calif. 1921.
- Burnett, W. L., State Agricultural College, Fort Collins, Colo. 1910.
- Burnham, Dr. Clark, 2287 Telegraph Road, Berkeley, Calif. 1907.
- Burnham, Miss Martha, 3129 Durand Drive, Hollywood, Calif. 1928.
- Burns, Frank L., Berwyn, Penn. 1909.
- Burt, Dr. William Henry, Calif. Institute Technology, Pasadena, Calif. 1928.
- Burtch, Verdi, Branchport, N. Y. 1910.
- C
- Cain, Brighton C., 221 Thayer Bldg., Oakland, Calif. 1925.
- Calder, James A., Buena Park, Calif. 1917.
- Calder, Mrs. James A., Buena Park, Calif. 1926.
- Camp, Dr. Chas. L., Bacon Hall, Univ. Calif., Berkeley, Calif. 1909.
- Campbell, Berry, 138 N. Poppy St., Monrovia, Calif. 1930.
- Canby, Miss Caroline P., San Fernando, Calif. 1921.
- Canfield, Mrs. May, 3672 Florida St., San Diego, Calif. 1922.
- Cantwell, George G., 3602 Keystone Ave., Palms, Calif. 1915.
- Capen, Miss Ethel Adele, 477 S. Hudson Ave., Pasadena, Calif. 1929.
- Carpenter, Nelson K., 3775 Kite St., San Diego, Calif. 1901.
- Carr, Mrs. R. B., 2701 Claremont Blvd., Berkeley, Calif. 1927.
- Carriger, Henry W., 5185 Trask St., Oakland, Calif. 1895.
- Carroll, James J., P. O. Box 356, Houston, Texas. 1926 (1929). [L.]
- Carson, Carl L., 6308 Broadway Terrace, Oakland, Calif. 1927.
- Carter, John D., Landsdowne, Penn. 1930.
- Cartwright, Bertram William, 392 Woodlawn St., St. James, Winnipeg, Manitoba, Canada. 1930.
- Chambers, W. Lee, Box 123, Eagle Rock P. O. Sta., Los Angeles, Calif. 1897 (1919). [L.]

- *Chamberlain, C. W., Hotel Hemingway, Boston, Mass. 1912.
- Chaney, Dr. Ralph W., 1129 Keith Ave., Berkeley, Calif. 1923.
- Chapman, Dr. Frank M., Amer. Museum Nat. Hist., New York, N. Y. 1903.
- Chattin, Miss Susan E., Museum Vert. Zool., Univ. Calif., Berkeley, Calif. 1927.
- Cheney, Miss Mary, 48 Hartford Road, South Manchester, Conn. 1919.
- Childs, E. C., Brent School, Baguio Mountain Province, P. I. 1930.
- Christy, Bayard H., 403 Frederick Ave., Sewickley, Penn. 1928.
- *Clabaugh, Ernest Dwight, 18 Lenox Road, Berkeley, Calif. 1923.
- Clark, Prof. Harold W., La Jota, Napa County, Calif. 1925.
- Clark, Miss Jess L., Chicago Academy Sciences, Chicago, Ill. 1928.
- Clary, Mrs. Ben Little, Coral Reef Ranch, Coachella, Calif. 1929.
- Cockefair, Miss Ellen A., 4021 Howe St., Oakland, Calif. 1925.
- Coe, John Edwin, 4015 N. Ashland Ave., Chicago, Ill. 1929.
- Coffin, Mrs. Percival B., 5708 Kenwood Ave., Chicago, Ill. 1926.
- Coggins, Herbert L., 2929 Piedmont Ave., Berkeley, Calif. 1910.
- Cohen, Donald A., R. 1, Box 404, Hayward, Calif. 1901.
- *Colburn, A. E., 716 S. Flower St., Los Angeles, Calif. 1905 (1915). [L.]
- Cole, Mrs. Arthur H., 816 San Luis Road, Berkeley, Calif. 1917.
- Cole, F. R., U. S. Entomological Laboratory, 724 Earlam Drive, Whittier, Calif. 1920.
- Cole, John E., 2143 Parkview Ave., Pasadena, Calif. 1929.
- Coman, Edwin T., 243 Valparaiso Road, Menlo Park, Calif. 1930.
- Commons, Mrs. Frank W., Crystal Bay, Minn. 1929.
- Compton, Lawrence V., 409 W. Webster St., Pittsburg, Kansas. 1927.
- *Conover, H. B., 6 Scott St., Chicago, Ill. 1924 (1924). [L.]
- Cook, Frederick W., 1604 E. Harrison St., Seattle, Wash. 1919.
- Cook, Miss Inez, Glendora, Calif. 1924.
- Cooke, Miss May T., 2572 University Place, Washington, D. C. 1918.
- Cookman, Alfred, 909 Bradford St., Pomona, Calif. 1912.
- Coombs, Ronald Harrison, 642 Duquesne Ave., Culver City, Calif. 1927.
- Cooper, James S., 310 Howard Ave., Piedmont, Calif. 1903.
- *Cottam, Clarence, 908 B St., S.W., Washington, D. C. 1926.
- Coursen, G. Blair, 761 East 69th Place, Chicago, Ill. 1929.
- Cowles, Raymond B., Univ. Calif. at Los Angeles, Los Angeles, Calif. 1928.
- Cozens, Harold H., 1631 Posen Ave., Berkeley, Calif. 1921.
- Craig, Miss Alice, 1968 Los Angeles Ave., Berkeley, Calif. 1928.
- Craven, Jesse T., 8935 Colfax St., Detroit, Mich. 1909.
- Crockett, Harry L., 38 Indianola Ave., Phoenix, Ariz. 1924.
- Crosby, Maunsell S., Grasmere Farms, Rhinebeck, N. Y. 1911.
- Crow, Miss Elizabeth D., 129 West Sixth St., Claremont, Calif. 1929.
- Crum, Miss Ethel, Box 92, Concord, Calif. 1920.
- Crump, Judge Guy R., 1721 Oak Grove, San Marino, Calif. 1927.
- Culver, George B., Stanford University, Calif. 1921.
- Culver, Miss Susan B., 2423 Prospect St., Berkeley, Calif. 1914.
- Culver, William L., 2701 Russ Bldg., San Francisco, Calif. 1930.
- Currier, Ed. S., 416 E. Chicago St., St. Johns Sta., Portland, Oregon. 1904.
- Cutler, Dr. Ira E., Zool. Dept., Univ. Denver, Denver, Colo. 1926.

D

- Danby, Durward E., R. 3, Box 502, Santa Cruz, Calif. 1927.
- Danforth, Stuart Taylor, College of Agriculture, Mayaguez, Porto Rico. 1925.
- Davenport, Mrs. Elizabeth B., Northern Ave., Brattleboro, Vermont. 1911.
- Davidson, Mrs. M. E. McLellan, Calif. Academy Sciences, San Francisco, Calif. 1919.
- Davis, Dr. Frederick B., 2810 Woolsey St., Berkeley, Calif. 1916.
- Davis, Henry W., Seaside Hotel, Atlantic City, N. J. 1922.
- Davis, John M., 227 Clark St., Eureka, Calif. 1908.
- Davis, Minot, 701 North E St., Tacoma, Wash. 1924.
- Davis, W. B., Route 2, Oroville, Calif. 1930.
- Deane, Ruthven, 112 W. Adams St., Chicago, Ill. 1904.
- Deane, Walter, 29 Brewster St., Cambridge, Mass. 1907.
- Dearborn, Dr. Ned, School of Forestry and Conservation, Ann Arbor, Mich. 1909.
- DeFremercy, Herman, Box 1202, Oakland, Calif. 1928.
- DeGroot, Dudley S., Menlo School, Menlo Park, Calif. 1916.
- Delacour, Jean, Chateau de Cleres, Seine Inferieure, France. 1927.
- Delareuelle, Robert, 1136 East 33rd St., Oakland, Calif. 1930.
- De Lury, Ralph E., Dominion Observatory, Ottawa, Ontario, Canada. 1926.
- Denny, Judge Thomas C., Sonoma, Calif. 1924.
- Deshler, George Byron, 494 Lincoln Ave., Pasadena, Calif. 1928.

Dexter, B. D., 2519 Ashby Ave., Berkeley, Calif. 1928.

* **Dickey, Donald R., Calif. Institute of Technology, Pasadena, Calif. 1910 (1915). [L.]

Dickey, Mrs. Florence V. V., 514 Rosemont Ave., Pasadena, Calif. 1923.

Dille, F. M., Valentine, Neb. 1903.

Dixon, James Benjamin, Escondido, Calif. 1924.

Dixon, Joseph S., Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1904.

Dodge, Miss Laura I., 3031 Eliot St., Long Beach, Calif. 1915.

Doolittle, E. A., Box 44, Painesville, Ohio. 1918.

Drengberg, John H., Carrier 506, Eagle Rock, Calif. 1928.

Drowne, Dr. F. P., 19 Croade St., Warren, R. I. 1930.

DuBois, Alexander Dawes, R. 2, Christmas Lake Road, Excelsior, Minn. 1911.

Duprey, H. F., Dixon, Calif. 1907.

E

Easton, Mrs. Jane F., Torrey Road, La Jolla, Calif. 1920.

Edge, Chester W., R. 3, Box 21, Healdsburg, Calif. 1930.

Edson, J. M., Marietta Road, Bellingham, Wash. 1911.

Edmunds, Margaret M., Crockett, Calif. 1929.

Edwards, Myrtle S. (Mrs. Harlan), 225 E. 11th St., Claremont, Calif. 1924.

Edwards, J. C., 629 S. Grand Ave., Los Angeles, Calif. 1929.

*Eggleston, J. W., Junior College, Riverside, Calif. 1913 (1919). [L.]

Ehinger, Dr. C. E., 730 Grand Ave., Keokuk, Iowa. 1929.

Eisenman, Roland G., 2441 9th Ave., Oakland, Calif. 1927.

Ellis, Mrs. Ella Haines, 910 Grattan St., Los Angeles, Calif. 1922.

Ellis, Ralph, 2420 Ridge Road, Berkeley, Calif. 1923.

*Ellis, Ralph, Jr., 2420 Ridge Road, Berkeley, Calif. 1923 (1926). [L.]

Elmore, Louis A., Ukiah, Calif. 1920.

Emerson, W. Otto, Palm Cottage, Hayward, Calif. 1901 (1921). [L.]

Emilio, S. Gilbert, 7 Winter St., Salem, Mass. 1926.

Emlen, John T., Jr., 36 W. School Lane, Germantown, Phila., Pa. 1930.

Erickson, Mary M., Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1930.

Everhart, Mrs. Helen, 750 E. Colorado St., Pasadena, Calif. 1925.

Evins, Samuel Nesbitt, 188 14th St., N.E., Atlanta, Ga. 1929.

F

Fargo, William G., 506 Union St., Jackson, Mich. 1928.

Farley, F. L., Camrose, Alberta, Canada. 1923.

Faufel, Edward L., 628 S. Broadway, Los Angeles, Calif. 1928.

Ferguson, Mrs. Aurelia B., 999 Gramercy Drive, Los Angeles, Calif. 1922 (1922). [L.]

Ferguson, Mrs. Mary Van E., 1 Orchard Lane, Berkeley, Calif. 1915.

Field, Clyde L., 1859 Julian Ave., San Diego, Calif. 1919.

Figgins, J. D., Colo. Museum Nat. Hist., Denver, Colo. 1925.

Fink, George W., Crows Landing, Calif. 1929.

Finley, William L., Jennings Lodge, Oregon. 1900.

Fisher, Miss Edna M., 2410 Fulton St., Berkeley, Calif. 1923.

Fisher, Miss Elizabeth W., 2222 Spruce St., Philadelphia, Penn. 1910.

Fisher, Prof. Walter K., Hopkins Marine Sta., Pacific Grove, Calif. 1900.

Fleming, J. H., 267 Rusholme Road, Toronto 4, Ontario, Canada. 1910.

Fletcher, L. B., 54 Cotswold Road, Brookline, Mass. 1922.

Floyd, Charles B., 454 Wolcott St., Auburndale, Mass. 1922.

Flynn, Miss Helen, 1094 Keith Ave., Berkeley, Calif. 1920.

Follett, W. I., 3621 Broadway, Oakland, Calif. 1926.

Forrest, Earle R., 205 N. Main St., Washington, Penn. 1910.

Fortiner, John C., Box 496, Brawley, Calif. 1910.

Foulk, Mrs. H. D., 2312 Stuart St., Berkeley, Calif. 1927.

Fowler, Frederick H., 221 Kingsley Ave., Palo Alto, Calif. 1901.

Frazer, J. Thomas, Jr., 432 W. Hawthorne St., Eureka, Calif. 1921.

Frazier, J. F., 724 Proctor Place, Independence, Mo. 1930.

French, Mrs. A. J., Carlton, Oregon. 1921.

French, Dr. Charles E., 62 Holyrood Ave., Lowell, Mass. 1926.

French, Miss Mena Vestal, Box 171, Wayland, Mass. 1929.

Frick, G. A., 5922 Tipton Way, Los Angeles, Calif. 1929.

Friedmann, Dr. Herbert, Div. of Birds, U. S. National Museum, Washington, D. C. 1927.

Frederick, George W., 3029 Belmont Ave., Chicago, Ill. 1926.

Fryklund, P. O., Roseau, Minn. 1929.

G

Gabrielson, Ira N., 515 P. O. Bldg., Portland, Ore. 1919.

Gallup, Frederick Norman, Escondido, Calif. 1921.

Gander, Frank Forrest, P.O. Box 395, East San Diego, Calif. 1927.

Garber, Miss Lida J., 15 Tanglewood Road, Berkeley, Calif. 1923.

- Gardner, Dr. Leon L., Fitzsimmons Hospital, Denver, Colo. 1911-1916, 1926.
 Garner, H. H., 840 Indian Hill Blvd., Pomona, Calif. 1927.
 Gault, Benj. T., 424 S. Main St., Glen Ellyn, Ill. 1905.
 Gausbeck, A. T., 60 Broadway, New York City, N. Y. 1924.
 Gay, Harold S., 200 S. Wilson Ave., Alhambra, Calif. 1901.
 Geiselhart, Miss Josephine, Concord, Calif. 1920.
 Giannini, Charles A., Poland, N. Y. 1919.
 Giddings, Levi A., 772 Yale Ave., Salt Lake City, Utah. 1923.
 Gifford, Dr. Harold, 3636 Burt St., Omaha, Nebraska. 1916.
 Gignoux, Claude, 73 Tunnel Road, Berkeley, Calif. 1919.
 Gilbert, Robert Keech, 101 N. Arden Blvd., Los Angeles, Calif. 1929.
 Gillmeister, Victoria E., 405 Meridian Road, San Jose, Calif. 1930.
 Gilman, M. French, Banning, Calif. 1901.
 Gilmore, Raymond M., 2559 LeConte Ave., Berkeley, Calif. 1926.
 Glassell, S. A., 1533 Santa Monica Blvd., Beverly Hills, Calif. 1929.
 Goelitz, Walter A., 170 Nunda Blvd., Rochester, N. Y. 1915 (1920). [L.]
 Goldman, Edward A., Biological Survey, Washington, D. C. 1901.
 Gordon, Kenneth L., Dept. Zool., State Agricultural College, Corvallis, Oregon. 1927.
 Grasett, Frank G., 535 Green Bay Road, Glencoe, Ill. 1926.
 Gregory, C. E., Box 215, Morganton, N. C. 1930.
 Gregory, Stephen S., Jr., Box N, Winnetka, Ill. 1924.
 Grey, Henry, R. 2, Box 168, San Diego, Calif. 1901.
 Grimes, Samuel A., 3615 Mayflower St., Jacksonville, Florida. 1924.
 Grinnell, Dr. George Bird, 238 E. 15th St., New York, N. Y. 1914.
 Grinnell, Hilda Wood (Mrs. Joseph), 3016 Benvenue Ave., Berkeley, Calif. 1912 (1921). [L.]
 Grinnell, Prof. Joseph, Museum Vert. Zoology, Univ. Calif., Berkeley, Calif. 1894 (1919). [L.]
 Grinnell, Willard Fordyce, 3016 Benvenue Ave., Berkeley, Calif. 1921.
 Gross, Prof. Alfred O., 11 Boody St., Brunswick, Maine. 1923.
 Gunn, Miss Amy E., 2758 Green St., San Francisco, Calif. 1914.
 Gunthorp, Prof. Horace, Univ. Ariz., Tucson, Arizona. 1920.
- H**
- Hachisuka, Masauji, care Japanese Embassy, 37 Portsmouth Sq., London, Eng.
 Hague, Miss Florence S., Dept. Biol., Sweet Briar College, Sweet Briar, Virginia. 1925.
 Hales, Prof. B. J., Normal School, Brandon, Manitoba, Canada. 1929.
 Haley, Dr. George, 2121 Hearst Ave., Berkeley, Calif. 1925.
 Hall, Mrs. Carlotta C., 1301 Bryant St., Palo Alto, Calif. 1905.
 Hall, Dr. E. Raymond, Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1924.
 Hall, Mrs. Elmer E., 1501 LeRoy Ave., Berkeley, Calif. 1929.
 Halladay, Daniel S., 628 E. Chestnut Ave., Santa Ana, Calif. 1910.
 Halleck, Taylor H., Newport, Ore. 1923.
 Hallinen, J. E., Cooperton, Kiowa Co., Oklahoma. 1921.
 Hand, Ralph L., U. S. Forest Service, Avery, Idaho. 1927.
 Handley, Charles O., Ashland, Virginia. 1927.
 Hann, H. H., 1042 Siskiyou St., Portland, Oregon. 1909.
 Hanna, Dr. G. Dallas, Calif. Academy Sciences, San Francisco, Calif. 1921.
 Hanna, Wilson C., 141 East F St., Colton, Calif. 1902 (1921). [L.]
 Harbison, Miss Julia Esther, Vacaville, Calif. 1928.
 Hardisty, Arthur H., Hartsville, Penn. 1927.
 Harper, Dr. Francis, 206 Dickinson Ave., Swarthmore, Penn. 1920.
 Harris, Harry, 5234 Hermosa Ave., Eagle Rock P. O. Sta., Los Angeles, Calif. 1914 (1919). [L.]
 Harris, Leonard H., R. 4, Box 616, Santa Rosa, Calif. 1928.
 Hart, Cecil, 132 N. Third St., Montebello, Calif. 1920.
 Hart, Mrs. Charles W., Fullerton, Calif. 1930.
 Hart, Hugh E., Medina, N. Y. 1927.
 Harter, Samuel G., 3848 Third St., San Diego, Calif. 1927.
 Hartung, Miss Esther Margaret, 124 Mill St., Grass Valley, Calif. 1923.
 Harvey, Miss Annie G., 905 S St., Fresno, Calif. 1929.
 Harwell, Charles Albert, National Park Service, Yosemite, Calif. 1925.
 Hatch, Mrs. Jessie Hoyt, Imperial, Calif. 1928.
 Hathaway, Harry S., Norwood and Thorn Aves., South Auburn, R. I. 1912.
 Havemeyer, Henry O., Mahwah, N. J. 1917.
 Haven, Herbert M. W., 500 Forest Avenue, Portland, Maine. 1926.
 Hawkins, Leslie Gilman, 157 Frisbie St., Oakland, Calif. 1930.
 Heath, Prof. Harold, 181 Ocean View Ave., Pacific Grove, Calif. 1919.
 Heermans, Miss Martha, Hayden, Ariz. 1929.
 Heineman, O. J., 14 Bay View, Mill Valley, Calif. 1908.
 Heller, Edmund, Zoological Park, Milwaukee, Wis. 1894.

Helme, Arthur H., Miller Place, Suffolk Co., N. Y. 1911.
 Henderson, A. D., Belvedere, Alberta, Canada. 1923.
 Henderson, Prof. Junius, Univ. Colorado, Boulder, Colo. 1909.
 Henderson, Walter C., 8 Magnolia Parkway, Chevy Chase, Md. 1918.
 Henne, Christopher, 3rd, 1258 Hillcrest Ave., Pasadena, Calif. 1929.
 Hersey, F. Seymour, Easton, Mass. 1915 (1920). [L.]
 Hess, Harlan B., Stanford University, Calif. 1928.
 Hesse, Curtis, Dept. Paleontology, Univ. Calif., Berkeley, Calif. 1930.
 Hill, Mrs. Howard G., 329 Summit Ave., Redlands, Calif. 1924.
 Hilton, Dr. W. A., Pomona College, Claremont, Calif. 1921.
 Hine, James S., State Museum, Columbus, Ohio. 1929.
 Hinze, Miss Lucile, 813 S. Adams St., Glendale, Calif. 1929.
 Hoag, Benj., Garfield, N. Y. 1927.
 Hodges, Miss Fanny, Box 34, Halcyon, San Luis Obispo Co., Calif. 1930.
 Hodgkins, Albert E., 347 E. Flora St., Stockton, Calif. 1929.
 Hoffmann, Ralph, Nat. Hist. Museum, Mission Canyon, Santa Barbara, Calif. 1920 (1928). [L.]
 Holgersen, Miss Violet D., 2616 Channing Way, Berkeley, Calif. 1929.
 Holland, Harold M., Box 515, Galesburg, Ill. 1901 (1920). [L.]
 Holman, F. C., Box 8, Yosemite, Calif. 1914 (1928). [L.]
 Hoover, Prof. Theodore J., Box A, Stanford University, Calif. 1898 (1916). [L.]
 Hopkins, Cranson H., 920 McKinley Ave., Oakland, Calif. 1930.
 Horsfall, R. Bruce, 1214 16th St., Washington, D. C. 1914.
 Howard, Dr. Hildegard, 973 N. Normandie Ave., Los Angeles, Calif. 1924.
 Howatt, Dr. G. A., 324 F St., Eureka, Calif. 1925.
 *Howell, Alfred Brazier, Dept. of Anatomy, Johns Hopkins Medical School, Baltimore, Md. 1908 (1915). [L.]
 Howell, Arthur H., 2919 S. Dakota Ave., Washington, D. C. 1916.
 Howitt, Miss Beatrice Fay, 1341 7th Ave., San Francisco, Calif. 1927.
 Howsley, Lucien R., 3623 E. 60th Place, Maywood, Calif. 1927.
 Huber, Wharton, Academy Natural Sciences, 19th and Race Sts., Philadelphia, Penn. 1915.
 Hubricht, Russell, 3614 E. Norton Ave., Lynwood, Calif. 1927.
 Huey, Laurence M., Natural History Museum, Balboa Park, San Diego, Calif. 1909 (1921). [L.]
 Hughes, George T., Box 153 Plainfield, N. J. 1927.

Hungate, Prof. J. W., State Normal School, Cheney, Wash. 1924.
 Hunt, Chreswell J., 810 S. 18th Ave., Maywood, Ill. 1919.
 Hunter, Geo., Salinas, Calif. 1930.
 Hurley, John B., 710½ E. Chestnut St., Yakima, Wash. 1921.

I

**Ingersoll, Albert M. 908 F St., San Diego, Calif. 1895.
 Ingles, Lloyd Glenn, 2404 San Emidio, Bakersfield, Calif. 1928.
 Isham, C. Bradley, 909 Valley Road, Upper Montclair, N. J. 1909.

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Jackson, Dr. Hartley H. T., Biological Survey, Washington, D. C. 1921.
 Jackson, Ralph W., R.D. 1, Cambridge, Md. 1917.
 Jacobsen, W. C., 1341 43rd St., Sacramento, Calif. 1916.
 Jacot, Edward C., Box 462, Prescott, Ariz. 1923.
 Jaeger, Edmund C., 1462 W. 6th St., Riverside, Calif. 1922.
 Jaques, Francis L., American Museum Nat. Hist., New York, N. Y. 1927.
 Jay, Antonin, 1622 Pennsylvania Ave., Los Angeles, Calif. 1901.
 Jay, William, 12 Westview Ave., Mt. Airy, Philadelphia, Penn. 1925.
 Jenkins, Elizabeth Shirley, 3769 Grim St., San Diego, Calif. 1929.
 Jensen, J. P., Dassel, Miss. 1927.
 Jerrard, Robert Bruce, Calcite, Colo. 1927.
 Jesser, Harvey Hogan, 4232 Montgomery St., Oakland, Calif. 1925.
 Jesurun, Dr. Mortimer, 905 Gaviota Ave., Long Beach, Calif. 1916.
 Jewett, Stanley G., 582 Bidwell Ave., Portland, Ore. 1909.
 Johnson, Dr. Myrtle E., 205 E. 8th St., National City, Calif. 1908.
 Jones, Dr. Lynds, Museum, Oberlin College, Oberlin, Ohio. 1911.
 Jones, S. Paul, 509 West Ave. North, Waukesha, Wis. 1929.
 Jordan, A. H. B., Everett, Wash. 1911.
 Jordan, Dr. David Starr, Stanford University, Calif. 1902.
 Judson, W. B., 1020 Chapman Bldg., 756 S. Broadway, Los Angeles, Calif. 1894.

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Kaeding, George L., 704 Palm Drive, Glendale, Calif. 1903.
 Kahmann, Karl W., Route 2, Hayward, Wisconsin. 1927.
 Kalmbach, Edwin R., Biological Survey, Washington, D. C. 1923.
 Kautz, Miss E. Beryl, 510 Stanyan St., San Francisco, Calif. 1927.
 Keeler, Mrs. Laurretta B., 901 Laguna Ave., Burlingame, Calif. 1925.

- Kellogg, Miss Louise, The Regillus, 19th and Jackson Sts., Oakland, Calif. 1911 (1927). [L.]
- Kellogg, Miss Mildred, 2232 Piedmont Ave., Berkeley, Calif. 1921.
- Kellogg, Ralph T., Silver City, N. M. 1916.
- Kellogg, Dr. Vernon L., National Research Council, B and 21st St., Washington, D. C. 1901.
- Kelly, Junea W. (Mrs. G. E.), 1311 Grand St., Alameda, Calif. 1918.
- Kelso, Dr. John E. H., Edgewood, Arrow Lakes, B. C., Canada. 1925.
- Kelso, Leon, 9901 E. Colfax St., Aurora, Colo. 1929.
- Kennard, F. H., Dudley Road, Newton Centre, Mass. 1911 (1916). [L.]
- Kennedy, Dr. Clarence H., Zool. Dept., State Univ., Columbus, Ohio. 1912.
- Kennedy, H. N., 16585 Burt Road, Detroit, Mich. 1925.
- Keys, Prof. Charles R., 323 Tenth Ave. South, Mt. Vernon, Iowa. 1900.
- Kibbe, Mrs. A. S., 1534 Grove St., Berkeley, Calif. 1917.
- King, Benjamin H., 1215 Lakeshore Drive, Coeur d'Alene, Idaho. 1921.
- King, Miss S. Edith, 1611½ Maltman Ave., Los Angeles, Calif. 1926.
- Kirn, Albert J. B., Box 157, Somerset, Texas. 1918.
- Kitchen, Jim, Lake Henshaw, Santa Ysabel, San Diego County, Calif. 1929.
- Kloss, Phillips, 3420 Webster St., Oakland, Calif. 1929.
- Knapp, Elmer, Route 2, Troy, Penn. 1924.
- Knickerbocker, Chas. K., 410 Michigan Ave., Chicago, Ill. 1905.
- Knox, Miss Florence, Hyland Apts., Salt Lake City, Utah. 1929.
- Kofoed, Prof. Chas. A., Zool Dept., Univ. Calif., Berkeley, Calif. 1909.
- Kretzmann, Prof. Paul E., 801 De Mun Ave., St. Louis, Mo. 1914.
- Kuser, John Dryden, Bernardsville, N. J. 1912.
- L**
- Labarthe, Jules, Hudson Bay Mining and Smelting Ltd., 500 Royal Bank Bldg., Winnipeg, Canada. 1914.
- Laing, Hamilton M., Comox, B. C., Canada. 1926.
- La Jeunesse, H. V., R. D. 3, Box 100, Hayward, Calif. 1916.
- Lamb, Chester C., Museum Vertebrate Zoology, Univ., Calif., Berkeley, Calif. 1901.
- Lancashire, Sarah H. (Mrs. J. Henry), 11 E. 69th St., New York, N. Y. 1911.
- Landberg, Robert, 4672 Sherman St., Denver, Colo. 1926.
- Lane, Geo. W., Morgan Hill, Calif. 1914.
- Langevin, Elmer, 325 South Broadway, Crookston, Minn. 1922.
- Langstroth, James H., P.O. Box D, Silver City, New Mexico. 1922.
- Larson, Miss Leigh Marian, 1242 S. Norton Ave., Los Angeles, Calif. 1929.
- Lastreto, C. B., 260 California St., San Francisco, Calif. 1913.
- Lathrop, Oliver Ames, 101 Beacon St., Boston, Mass. 1925.
- Lauderbach, Miss Frances, Box 23, Sta. C, Pasadena, Calif. 1927.
- *Law, Mrs. J. Eugene, Altadena, Calif. 1915 (1920). [L.]
- Lawrence, Alexander G., City Health Dept., Winnipeg, Canada. 1927.
- Layman, Miss Eleanor Catherine, 4363 Trias St., San Diego, Calif. 1930.
- Leavens, Mrs. Robert French, 1900 Yosemite Road, Berkeley, Calif. 1928.
- Leffingwell, Miss Marion, 250 Foothill Blvd., Arcadia, Calif. 1929.
- Leopold, Aldo, Forest Products Laboratory, Madison, Wis. 1916.
- Letl, Frank H., Field Museum Nat. Hist., Chicago, Ill. 1927.
- Levingston, Carl C., 1016 Ohio St., Redlands, Calif. 1929.
- Lewis, Edward H., Box 192, Avalon, Calif. 1929.
- Libby, Miss Gretchen L., La Vina Sanitarium, Pasadena, Calif. 1911.
- Liddell, Sidney, R. R. No. 1, Summerland, B. C., Canada. 1930.
- Light, Prof. S. F., Dept. Zool., Univ. Calif., Berkeley, Calif. 1929.
- Ligon, J. Stokley, Box 928, Carlsbad, New Mexico. 1914.
- Lincoln, Frederick C., Biological Survey, Washington, D. C. 1922.
- Linsdale, Dr. Jean M., Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1926.
- Little, Luther, 1400 Wayne Ave., South Pasadena, Calif. 1913 (1920). [L.]
- Littlejohn, Chase, 240 Fulton St., Redwood City, Calif. 1901.
- Lloyd, Hoyes, 582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 1923.
- Lodge, Fred S., 423 South Stone Ave., La Grange, Ill.
- Lofberg, Mrs. Lila McKinley, Edison Camp 62, Big Creek, Calif. 1925.
- Lombardi, Mrs. M. E., 2249 Piedmont Ave., Berkeley, Calif. 1916.
- Loring, J. Alden, U. S. Army, Owego, Tioga Co., N. Y. 1914.
- Lusk, Richard D., R.R. 2, Box 722, San Gabriel, Calif. 1915.
- Lyon, William I., 124 Washington St., Waukegan, Ill. 1928.
- Lyons, John D., Jr., Route 1, Box 6, Tucson, Arizona. 1928.
- Mc**
- MacAleer, Miss Mary G., 68 Post St., San Francisco, Calif. 1928.
- MacCaughey, Dr. Vaughan, 508 Sheldon Bldg., 461 Market St., San Francisco, Calif. 1929.
- McAtee, W. L., Biological Survey, Washington, D. C. 1907.

- McBride, Everett F., 817 Richfield Bldg., Los Angeles, Calif. 1923.
- McCabe, Elinor Bolles (Mrs. T. T.), Indianpoint Lake, Barkerville, B. C., Canada. 1929.
- McCabe, Thomas T., Indianpoint Lake, Barkerville, B. C., Canada. 1926.
- McCoy, Frank J., Santa Maria Inn, Santa Maria, Calif. 1923.
- McCoy, Herbert N., 2537 Fifth Ave., Los Angeles, Calif. 1928.
- McCreary, Otto, Agricultural Hall, Univ. Wyo., Laramie, Wyoming. 1928.
- McDonald, Mrs. James R., 2035 Lyon St., San Francisco, Calif. 1927 (1927). [L.]
- McGregor, Richard C., Bureau of Science, Manila, P. I. 1893 (1916). [L.]
- McGuire, Ignatius, 209 Guyot Hall, Princeton Univ., Princeton, N. J. 1929.
- McIntire, Mrs. Jessie, 2930 Waverly Place, Los Angeles, Calif. 1926.
- McKechnie, Dr. William C., 765 Granville St., Vancouver, B. C., Canada. 1926.
- McLain, Robert B., Box 132, Hollywood, Calif. 1897.
- McLean, Donald D., 101 E. James St., San Jose, Calif. 1916.
- McLaughlin, Donald, Goat Island, San Francisco, Calif. 1930.
- M
- Mackie, Rev. Augustine C., Vernon, B. C., Canada. 1929.
- Maescher, Miss Ada Belle, 4652 Mascot St., Los Angeles, Calif. 1928.
- Mailliard, Ernest C., Federal Reserve Bank, San Francisco, Calif. 1909.
- Mailliard, John W., 2461 Gough St., San Francisco, Calif. 1894.
- Marburger, Clifford, Denver, Lancaster Co., Penn. 1925.
- Marden, Aaron, Eagle Island, South Harpswell, Maine. 1927.
- Marshall, Dr. Benj. M., 2036 D St., Eureka, Calif. 1913.
- Martin, Mrs. Bertha Davis, 1644 Maltman Ave., Los Angeles, Calif. 1920.
- Martin, Early, Jr., 1909 Rio Grande St., Austin, Texas. 1929.
- Martz, Mrs. Warren H., 4601 Welch Place, Los Angeles, Calif. 1924.
- Massey, Herbert, Ivy Lea, Burnage, Didsbury, Manchester, England. 1909.
- May, Dr. John B., Div. Ornithology, 136 State House, Boston, Mass. 1929.
- Mead, Mrs. Edwin B., 2618 Etna St., Berkeley, Calif. 1920.
- Meador, Miss Inez, 830 McKinley Ave., Oakland, Calif. 1928.
- Meadows, Donald C., Box 732, Avalon, Calif. 1919.
- Meehan, Mrs. Eunice M., Big Creek, Calif. 1928.
- Meredith, George S., Farmers and Merchants Savings Bank, Oakland, Calif. 1927.
- *Mershon, W. B., Saginaw, Mich. 1911 (1919). [L.]
- Metzger, C. J., 6312 S. Ashland Ave., Chicago, Ill. 1926.
- Mexia, Mrs. Ynes, Care American Consul, Rio de Janeiro, Brazil. 1921.
- Michael, Chas. W., Yosemite, Calif. 1916.
- Michener, Harold, 418 N. Hudson Ave., Pasadena, Calif. 1924.
- Middleton, R. J., Whitehall Road, Norristown, Penn. 1919.
- Mikesell, Mrs. H. B., 1633 Addison St., Berkeley, Calif. 1925.
- Miller, Alden Holmes, Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1923.
- Miller, Dr. Loye Holmes, Univ. Calif. at Los Angeles, Los Angeles, Calif. 1905.
- Miller, Mary Mann, 5928 Hayes Ave., Highland Park, Los Angeles, Calif. 1920.
- Miller, Dr. Robert C., Dept. Zool., Univ. Washington, Seattle, Wash. 1921.
- Mills, Miss Laura Ethel, Fallon, Nevada. 1930.
- Mitchell, Mrs. Irving J., 1127 W. 20th St., Los Angeles, Calif. 1924.
- Mitchell, Dr. Walton L., 1644 Visalia St., Berkeley, Calif. 1909.
- Mix, Mrs. Arthur J., 1915 W. 8th St., Los Angeles, Calif. 1922.
- Moffitt, James, 1825 Broadway, San Francisco, Calif. 1917.
- Monk, Harry C., Avoca Apts., Nashville, Tenn. 1925.
- Moore, Miss Nellie, 122 Falcon Ave., Long Beach, Calif. 1915.
- Moore, Robert D., 744 Walnut Ave., Redlands, Calif. 1928.
- Moore, Robert T., 2485 Country Club Drive, Altadena, Calif. 1911.
- Moran, R. B., 1318 S. Gramercy Place, Los Angeles, Calif. 1897.
- More, R. L., Vernon, Texas. 1911.
- Morgan, Mrs. A. R. A., Box 406, Escondido, Calif. 1927.
- Morley, Prof. S. Griswold, 2635 Etna St., Berkeley, Calif. 1916.
- Morrill, Bob, Route 63, Arlington Road, Berkeley, Calif. 1929.
- Morse, De Milt, P.O. Box 217, Morro Bay, Calif. 1929.
- Morse, Frank E., 162 Boylston St., Boston, Mass. 1929.
- Morse, George W., 318 E. 9th St., Tulsa, Okla. 1922.
- Mullen, James L., 1264 Logan Ave., Salt Lake City, Utah. 1915.
- Munro, J. A., Okanagan Landing, B. C., Canada. 1914.
- Murie, Olaus J., Jackson, Wyoming. 1913.
- Myers, Mrs. Harriet W., 311 N. Ave. 66, Los Angeles, Calif. 1912.
- Myers, Miss Mabel Adelaide, 617 W. Center St., Anaheim, Calif. 1922.
- N
- Nace, Chas. A., 156 W. San Fernando St., San Jose, Calif. 1920 (1920). [L.]

- Nash, Herman W., Box 264, Pueblo, Colo. 1922.
- Naumburg, Mrs. Walter W., Hotel St. Regis, 5th Ave and 55th St., New York, N. Y. 1922.
- Neff, Johnson A., Marionville, Mo. 1920.
- Neilson, James A., Upper Lake, Calif. 1924.
- Nelson, Mrs. Jean M., 2920 Benvenue Ave., Berkeley, Calif. 1929.
- Nelson, Leroy S., 1825 14th Ave., Greeley, Colo. 1930.
- Nelson, Roy A., Livermore, Calif. 1925.
- Neterer, Miss Inez May, Lake Erie College, Painesville, Ohio. 1926.
- Newcomb, Cyrenius A., Jr., The Junipers, Bloomfield Hills, Route 3, Pontiac, Mich. 1928.
- Newhall, Mrs. Chas. S., 2629 Piedmont Ave., Berkeley, Calif. 1916.
- Nice, Mrs. Margaret M., 156 W. Patterson St., Columbus, Ohio. 1921.
- Nichols, John T., American Museum Nat. Hist., New York, N. Y. 1909.
- Noack, Harry R., 309 Perry St., Oakland, Calif. 1901.
- Nokes, Dr. I. D., 1120 Rives-Strong Bldg., Los Angeles, Calif. 1914.
- Norris, Miss Barbara, 2326 Warring St., Berkeley, Calif. 1930.
- Norris, Joseph Parker, Jr., 2122 Pine St., Philadelphia, Penn. 1911.
- Norton, Arthur H., 22 Elm St., Portland, Maine. 1918.
- Nunes, Mrs. R. A., Calpella, Calif. 1921.
- O
- Oberholser, Dr. Harry C., 2805 18th St., N. W., Washington, D. C. 1904.
- Oakes, Miss Alva, 586 Everett St., Portland, Oregon. 1929.
- O'Farrell, Mrs. Mabel E., 2403 F St., San Diego, Calif. 1917.
- Ogden, Dr. H. V., 141 Wisconsin St., Milwaukee, Wis. 1924.
- Ormsbee, Dan, 333 Alcatraz Ave., Oakland, Calif. 1929.
- Ormsby, Mrs. Oliver S., 5658 Blackstone Ave., Chicago, Ill. 1925.
- O'Roke, Dr. Earle C., School of Forestry, Univ. Mich., Ann Arbor, Michigan. 1929.
- Osgood, Dr. Wilfred H., Field Museum Nat. Hist., Chicago, Ill. 1893 (1927). [L.]
- Owen, Virgil W., 1352 N. Fuller Ave., Hollywood, Calif. 1896.
- P
- Pack, Arthur Newton, 11 Morven St., Princeton, N. J. 1925.
- Page, Paul E., 401 N. Yakima Ave., Tacoma, Wash. 1925.
- Palmer, Miss Elizabeth Day, 1741 Harvard Blvd., Los Angeles, Calif. 1909.
- Palmer, Dr. R. H., care A. L. Kemper, 766 Kensington Road, Los Angeles, Calif. 1915.
- Pangburn, Clifford H., Chappaqua, N. Y. 1920.
- Parker, Herbert, South Lancaster, Mass. 1911.
- Parmenter, Henry E., 8 E. Valerio St., Santa Barbara, Calif. 1916.
- Paroni, Miss Clelia A., 530 Arlington Ave., Berkeley, Calif. 1921.
- Parsons, Mrs. Edward L., 2504 Pacific Ave., San Francisco, Calif. 1929.
- Partin, J. L., 3324 Drew St., Los Angeles, Calif. 1930.
- Patterson, Mrs. Theresa Homet, 544 S. El Molino Ave., Pasadena, Calif. 1926 (1926). [L.]
- Paul, Lucius H., 424 Carter St., Rochester, N. Y. 1911.
- Payne, Miss Frances, Biol. Dept., High School, Alameda, Calif. 1927.
- Peabody, Rev. P. B., 2011 Park Ave., Topeka, Kans. 1904.
- Peake, Lionel A. McK., P.O. Box 368, Nanaimo, B. C., Canada. 1930.
- Pearse, Theed, Courtenay, B. C., Canada. 1927.
- Pease, Charles A., 308 Vassar St., Berkeley, Calif. 1930.
- Pearson, Dr. T. Gilbert, 1974 Broadway, New York, N. Y. 1910.
- Peck, Prof. Morton E., 1458 Court St., Salem, Oregon. 1909.
- Pellew, Miss Marion J., Box 455, Aiken, S. C. 1923.
- Pemberton, J. R., 525 N. Palm Drive, Beverly Hills, Calif. 1900 (1928). [L.]
- Penrose, Russell C., Grass Valley, Calif. 1930.
- Pennock, Chas. J., Kennett Square, Penn. 1909.
- Penny, W. R., Hotel Carlton, Berkeley, Calif. 1929.
- Perkins, Samuel E., 3rd, 701 City Trust Bldg., Indianapolis, Ind. 1926.
- Perley, Mrs. Lyman O., 3420 Lincoln Blvd., Omaha, Nebraska. 1927 (1927). [L.]
- Perry, Mrs. Elinor B., 254 Main St., Hayward, Calif. 1924.
- Peterson, Edward L., 1756 N. Gramercy Place, Hollywood, Calif. 1925.
- Peterson, Hans C., Box 396, Reedley, Calif. 1924.
- Pettit, Chas. deForest, 225 Bush St., San Francisco, Calif. 1928.
- Pettit, Muriel M. S., Apt. 9, 917 Cole St., San Francisco, Calif. 1928.
- Peyton, Laurence, R.D. 2, Fillmore, Calif. 1909 (1922). [L.]
- Peyton, Sidney B., R.D. 2, Fillmore, Calif. 1913 (1922). [L.]
- Phelps, Frank M., 130 Cedar St., Elyria, Ohio. 1912.
- *Phillips, Dr. John C., Knobfields, Wenham, Mass. 1911.
- *Philipp, P. B., 220 Broadway, New York, N. Y. 1911 (1920). [L.]
- Pickard, Miss Edith A., 2640 Durant Ave., Berkeley, Calif. 1926.

- Pickens, A. L., Dept. Zoology, Univ. Calif., Berkeley, Calif. 1928.
- Pickwell, Dr. Gayle B., State Teachers College, San Jose, Calif. 1928.
- *Pierce, Wright M., Box 343, Claremont, Calif. 1902 (1920). [L.]
- Pike, Eugene R., 2430 Lake View Ave., Chicago, Ill. 1927.
- Pitcher, Mrs. E. C., Route 3, Box 384, Hayward, Calif. 1920.
- Plath, Karl, 2847 Giddings St., Chicago, Ill. 1926.
- Porter, James V., Glenwood, Minn. 1927.
- Post, Fred, Salinas, Calif. 1930.
- Potter, Miss Jessica A., 1118 Santee St., Los Angeles, Calif. 1922.
- Potter, Laurence B., Gower Ranch, East-end, Sask., Canada. 1925.
- Pough, Richard H., 4 Lenox Place, St. Louis, Missouri. 1926.
- Powell, Miss Helen, Regillus Apts., 19th and Jackson Sts., Oakland, Calif. 1914 (1928). [L.]
- Pratt, Miss Helen S., 245 West Ridgeview Ave., Eagle Rock, Calif. 1920.
- Preble, Edward A., 3027 Newark St. Washington, D. C. 1926.
- Price, John B., Hotel Maryland, Glendale, Calif. 1926.
- Prill, Dr. A. G., Scio, Ore. 1921.
- Pringle, Miss Cornelia C., 1816 Vallejo St., San Francisco, Calif. 1915 (1921). [L.]
- Pursell, Wm. McLain, 511 Neilson St., Berkeley, Calif. 1926.
- Q**
- Quattlebaum, W. Dan, 1925 Paloma St., Pasadena, Calif. 1927.
- Quillin, Roy W., 422 West Kings Highway, San Antonio, Texas. 1921.
- R**
- Racey, Kenneth, 3262 First Ave. W., Vancouver, B. C., Canada. 1927.
- Randall, Mrs. W. S., 618 E. 15th St., Oklahoma City, Oklahoma. 1929.
- Randolph, Miss Flora A., 2962 Derby St., Berkeley, Calif. 1907.
- Ransom, Webster H., 708 W. 20th Ave., Spokane, Wash. 1921.
- Ray, Milton S., 2901 Broadway, San Francisco, Calif. 1899.
- Record, Miss Gladys E., 44 Fairview Ave., Los Gatos, Calif. 1926.
- Reid, Mrs. Bruce, Gulf Refinery, Port Arthur, Texas. 1929.
- Reif, Mrs. Vivian, 2033 Hearst Ave., Berkeley, Calif. 1928.
- Reis, C. Oscar, 646 Juanita Ave., Los Angeles, Calif. 1917.
- Rettig, Fred E., Route 1, Box 34B, Palo Alto, Calif. 1929.
- Reynard, C. R., 1418 N. 6th Ave., Tucson, Arizona. 1930.
- Reynolds, G. E., 1148 W. Rose St., Stockton, Calif. 1927.
- Rich, Dr. Guy C., 1820 El Cerrito Place, Hollywood, Calif. 1911.
- Rich, Waldo L., P. O. Box 221, Saratoga Springs, N. Y. 1919.
- Richards, Dr. T. W., U. S. N., 1724 P St., N. W., Washington, D. C. 1908.
- Richardson, Carl, Altamont Auto Camp, Klamath Falls, Oregon. 1925.
- Richardson, W. D., 4215 Prairie Ave., Chicago, Ill. 1918.
- Richardson, William, care Walter L. Richardson, R. D. 3, Box 243, Porterville, Calif. 1925.
- *Richmond, Dr. Charles W., U. S. National Museum, Washington, D. C. 1904.
- Richmond, Watts L., 170 Lancaster Ave., Buffalo, N. Y. 1930.
- Ridgway, John L., 501 Fairmont Ave., Glendale, Calif. 1926.
- Riley, J. H., U. S. National Museum, Washington, D. C. 1909.
- Rinehart, Miss Amy, 540 E. 7th St., Oakland, Calif. 1927.
- Rishel, John B., Whittier School, 24th Ave. and Marion St., Denver, Colo. 1925.
- Ritter, Prof. Wm. E., Mus. Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1901.
- Robb, Wallace H., Abbey Dawn, R. 1, Kingston, Ontario, Canada. 1925.
- Roberts, Dr. Thomas S., Museum Nat. History, Univ. Minnesota, Minneapolis, Minn. 1909.
- * **Robertson, Howard, 157 Wilton Drive, Los Angeles, Calif. 1896 (1926). [L.]
- *Robertson, John McB., Buena Park, Calif. 1913.
- Robertson, Mrs. John McB., Buena Park, Calif. 1920.
- Robinson, Anthony W., Box 462, Haverford, Penn. 1927.
- Roe, Mrs. E. D., Felton Water Wheel Co., 19th and Harrison Sts., San Francisco, Calif. 1919.
- Rose, Frank H., Reservation Warden, Moiese, Montana. 1927.
- Ross, Roland C., 1820 Bushnell Ave., South Pasadena, Calif. 1920.
- Rowan, Prof. William, Dept. Zool., Univ. Alberta, Edmonton, Alta., Canada. 1921.
- Rowen, Daniel, Berkeley Inn, Berkeley, Calif. 1925.
- Rowley, John Stuart, 403 S. 1st St., Alhambra, Calif. 1928.
- Rush, Miss Lora G., 1607 Walnut St., Berkeley, Calif. 1920.
- Russell, Ward C., R. 2, Box 13, Santa Cruz, Calif. 1930.
- Rust, Henry J., Box 683, Coeur d'Alene, Idaho. 1911.
- S**
- Sampson, Walter B., 1005 N. San Joaquin St., Stockton, Calif. 1894.
- Sampson, W. F., 215 Market St., San Francisco, Calif. 1926 (1928). [L.]
- Sandberg, Clarence H., 1527 Schiller St., Alameda, Calif. 1930.

- Sanford, Dr. Leonard C., 347 Temple St., New Haven, Conn. 1915.
- Sanford, Miss Mary Frances, Dept. Zool., Univ. Calif., Berkeley, Calif. 1929.
- Saunders, Aretas A., 48 Longview Ave., Fairfield, Conn. 1909.
- Saunders, Mrs. E. J., 122 N. Friends Ave., Whittier, Calif. 1925.
- Saunders, Mrs. Kenneth, High Acres, Creston Road, Berkeley, Calif. 1920.
- Saunders, W. E., London, Ont., Canada. 1910.
- Schaefer, Oscar F., 724 Woodbine Ave., Rochester, N. Y. 1917.
- Schenck, Sara M. (Mrs. W. Egbert), 101 Waverly St., Palo Alto, Calif. 1924.
- Schneider, Fred A., care Warren Dried Fruit Co., San Jose, Calif. 1901.
- Schneider, Mrs. G. H., 4618 Kingswell Ave., Los Angeles, Calif. 1921.
- *Schneider, J. J., 103 St. Joseph Ave., Long Beach, Calif. 1899.
- Schorger, A. W., 2021 Kendall Ave., Madison, Wis. 1928.
- Schwarting, Wm., 681 Spruce St., Oakland, Calif. 1930.
- **Sefton, J. W., Jr., 650 F St., San Diego, Calif. 1923.
- Sharp, Clarence S., Escondido, Calif. 1902.
- Shaw, Dr. W. T., 1002 Cambridge Ave., Fresno, Calif. 1911.
- Shearer, Dr. A. R., Mont Belvieu, Chambers Co., Texas. 1928.
- Sheffler, W. J., 4731 Angeles Vista Blvd., Los Angeles, Calif. 1930.
- Shepherd, Mrs. Hattie E., Route 1, Box 73, Redlands, Calif. 1921.
- *Sherman, Miss Althea R., Route 2, National, via McGregor, Iowa. 1911 (1916). [L.]
- Sherwood, Jack, Box 264, Salinas, Calif. 1923.
- Sherwood, William E., Trail, Oregon. 1924.
- Shiras, George. 3d, Stoneleigh Court, Washington, D. C. 1914.
- Shuey, Mrs. Ethel W., 12763 Kling St., North Hollywood, Calif. 1929.
- Silliman, Edmund, Alisal and Ryker Sts., Salinas, Calif. 1918.
- Silliman, O. P., 220 Salinas St., Salinas, Calif. 1893.
- Silva, Claude T., R.F.D. 628, San Lorenzo, Calif. 1929.
- Silverstone, Dr. Dave, 1232 Maryland Ave., Los Angeles, Calif. 1929.
- Simpson, Gene M., 744 N. 11 St., Corvallis, Ore. 1930.
- Skillen, Donald R., 4111 Walnut St., Philadelphia, Penn. 1927.
- Skinner, M. P., Jergins Trust Bldg., Long Beach, Calif. 1915 (1920). [L.]
- Sloanaker, Jos. L., 1117 Maxwell Ave., Spokane, Washington. 1910.
- Smith, Allyn G., 722 Santa Barbara Road, Berkeley, Calif. 1909.
- Smith, Austin P., Apartado 412, San Jose, Costa Rica. 1907.
- Smith, Chas. Piper, 354 S. 10th St., San Jose, Calif. 1923.
- Smith, Clarence F., 3145 Octavia St., San Francisco, Calif. 1928.
- Smith, C. R., 563 42nd Ave., San Francisco, Calif. 1917.
- Smith, Miss Emily, Route 1, Box 93, Los Gatos, Calif. 1924.
- Smith, Horace G., 2918 Lafayette St., Denver, Colo. 1914.
- Smith, Miss Josephine E., 51 Canyon Road, Berkeley, Calif. 1928.
- Smith, Loris Philbrick, 2017 108th Ave., Oakland, Calif. 1930.
- Smith, Napier, Bank of Montreal, Verdun, Quebec, Canada. 1919.
- Snell, Charles H., Box 101, Red Deer, Alberta, Canada. 1926.
- Snyder, C. L., Fort Bayard, New Mexico. 1930.
- Snyder, Prof. J. O., 542 Alvarado Ave., Stanford University, Calif. 1900.
- Snyder, L. L., Royal Ontario Museum of Zoology, Toronto, Ont., Canada. 1924.
- Spaulding, Prof. M. Herrick, State Agricultural College, Bozeman, Mont. 1918.
- Spaulding, Manfred K., Box 984, Westwood, Calif. 1924.
- Springer, George E., 2082 Oakland Ave., Piedmont, Calif. 1927.
- Sprot, George D., Cobble Hill, Vancouver Island, B. C., Canada. 1925.
- Stansell, S. S., 526 San Emidio St., Taft, Calif. 1925.
- Stedman, Miss Clara M., 3871 Howe St., Oakland, Calif. 1929.
- Steele, Ed. S., Las Cruces, New Mexico. 1926.
- Steinbeck, Wm. P., 611 Bristol Ave., Stockton, Calif. 1897.
- Stephens, Prof. T. C., Morningside College, Sioux City, Iowa. 1914.
- Stevens, Laurence, 918 E. Haley St., Santa Barbara, Calif. 1930.
- Stevenson, James, 4213 Dundee Drive, Los Angeles, Calif. 1928.
- Stewart, Paul A., Leetonia, Ohio.
- Stirton, R. A., Museum Paleontology, Univ. Calif., Berkeley, Calif. 1928.
- Stoddard, H. L., Biological Survey, Washington, D. C. 1914.
- Stone, Harry Herbert, Jr., P. O. Box 101, Sturbridge, Mass. 1925.
- Stone, Dr. Witmer, Academy Nat. Sciences, Logan Circle, Philadelphia, Penn. 1924.
- Stoner, Emerson A., Box 444, Benicia, Calif. 1918.
- Storer, Prof. Tracy I., University Farm, Davis, Calif. 1910.
- Stow, Harry P., 1617 Central Ave., Alameda, Calif. 1921.
- Streator, Clark P., 16 Mason St., Santa Cruz, Calif. 1919.
- Strecker, John Kern, Baylor Univ., Waco, Texas. 1928.
- Strohbeen, J. P., 15 Penn Ave., Santa Cruz, Calif. 1928.

- *Strong, Wm. A., 41 Grand Ave., San Jose, Calif. 1912 (1920). [L.]
 Stuart, George H., 3d, 923 Clinton St., Philadelphia, Penn. 1913.
 Suffel, Shumway, 1015 S. Oak Knoll Ave., Pasadena, Calif. 1926.
 Sugden, J. W., 47 S. 8th W. St., Salt Lake City, Utah. 1915.
 Sumner, E. L., Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1924.
 Sumner, Francis H., 760 University Ave., Palo Alto, Calif. 1929.
 Sutton, Dr. George M., Pebble Hearths, Bethany, West Virginia. 1924.
 Swanson, Gustav, 3305 47th Ave. S., Minneapolis, Minn. 1928.
 *Swarth, Harry S., 2800 Prince St., Berkeley, Calif. 1897 (1923). [L.]
 Swasey, Miss Alice J., 2626 Benvenue Ave., Berkeley, Calif. 1930.
 Swenk, Prof. Myron H., 1410 N. 37th St., Lincoln, Nebraska. 1916.

T

- Taft, Elsey R., Banning, Calif. 1925.
 Tait, Eric, Summerland, B. C., Canada. 1928.
 Tanner, Prof. V. M., Brigham Young Univ., Provo, Utah. 1919.
 Taverner, P. A., National Museum, Ottawa, Ont., Canada. 1909.
 Taylor, Robert, 4030 Coolidge Ave., Oakland, Calif. 1930.
 Taylor, Mrs. H. J., 2813 Channing Way, Berkeley, Calif. 1920.
 Taylor, Jesse H., Box 125, Eagle Rock Sta., Los Angeles, Calif. 1919.
 Taylor, Dr. Walter P., Biol. Surv. Field Office, Univ. Ariz., Tucson, Arizona. 1905.
 Teachenor, Dix, 1020 W. 61st St., Kansas City, Missouri. 1922.
 Teall, Ralph C., Venice High School, Venice, Calif. 1928.
 Tegland, Miss Nellie May, 935 S.ushman Ave., Tacoma, Wash. 1927.
 *Thayer, John E., Box 98, Lancaster, Mass. 1906 (1914). [L.]
 Thomas, E. J., 230 W. 23rd St., Los Angeles, Calif. 1929.
 Thomas, George C., 3d, 1014 Crescent Drive, Beverly Hills, Calif. 1922.
 Thomas, Gerald B., Jr., 1454 W. 53rd St., Los Angeles, Calif. 1929.
 Thompson, J. Walcott, 527 E. 1st S. St., Salt Lake City, Utah. 1918.
 Thomson, Miss Isabel A., 5939 Shafter Ave., Oakland, Calif. 1918.
 Thorne, Mrs. U. S., 810 5th Ave., New York, N. Y. 1927 (1928). [L.]
 Thorpe, William H., Farnham House Laboratory, Farnham Royal, Bucks, England. 1928.
 Thowless, Herbert L., 255 Fourth St., Newark, N. J. 1919.
 Tindall, Charles W., 912 N. Noland St., Independence, Missouri. 1920.

- Todd, W. E. Clyde, Carnegie Museum, Pittsburgh, Penn. 1909.
 Tonkin, George, Biological Survey, 211 P.O. Bldg., Berkeley, Calif. 1920.
 Torrey, Frederic C., 1 Canyon Road, Berkeley, Calif. 1922.
 *Townsend, Dr. Charles W., Ipswich, Mass. 1925.
 Trabucco, Mrs. Minnie L., Box 164, Jamestown, Calif.
 Trapier, Paul E., 7020 Spad Place, Culver City, Calif. 1926.
 Treganza, A. O., Lemon Grove, San Diego Co., Calif. 1907.
 Trempe, Alfred D., 612 Kimball St., Sault Ste. Marie, Mich. 1929.
 Trescot, E. B., R. D. 4, Box 357, Petaluma, Calif. 1915.
 Trost, Henry, 475 29th St., San Francisco, Calif. 1924.
 Trumbull, J. H., 39 Farmington Ave., Plainville, Conn. 1911.
 Tucker, Mrs. Carl, 733 Park Ave., New York, N. Y. 1927.
 Tucker, Henry, 1818 Pine St., Philadelphia, Pa. 1927.
 Tucker, Nion E., 111 Sutter St., San Francisco, Calif. 1929.
 Turnbull, James Douglas, 2065 48th Ave. W., Vancouver, B. C., Canada. 1923.
 Twining, Mrs. Frances M., 802 Gasco Bldg., Portland, Oregon. 1927.
 Tyler, John G., P. O. Box 173, Fresno, Calif. 1905 (1920). [L.]
 Tyler, Dr. Winsor M., 112 Pinckney St., Boston, Mass. 1914.

U

- Uhler, Francis Morey, Biological Survey, Washington, D. C. 1928.
 Underdown, Chas. Eliot, 8216 Manor Road, Elkins Park, Penn. 1929.
 Unglish, W. E., Gilroy, Calif. 1910.
 Urner, Charles Anderson, 596 Westminster Ave., Elizabeth, N. J. 1925.

V

- *Van Rossem, Adriaan J., 514 Rosemont Ave., Pasadena, Calif. 1909.
 Van Schaick, John, Jr., 176 Newbury St., Boston, Mass. 1928.
 Van Straaten, H., Het Veldhuis, 8 Denersweg, Velp, Holland. 1918 (1919). [L.]
 Varick, Dr. William Remsen, 2027 Santa Barbara St., Santa Barbara, Calif. 1923.
 Vignos, Miss Blanche, 915 S. Carondelet St., Los Angeles, Calif. 1926.
 Von Berlepsch, Dr. Freiherr Hans, Seebach, Kreis Langensalza, Thuringen, Germany. 1930.
 Von Bloeker, John, Jr., Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1927.
 Vorhies, Prof. Chas. T., Univ. Arizona, Tucson, Ariz. 1916.

W

- Wackler, Miss E. Giralda, 3941 Wilda Ave., Oakland, Calif. 1928.

- Wales, Joseph H., Box 641, Stanford University, Calif. 1925.
- Walker, Alex., Tillamook, Ore. 1911.
- Walker, Ernest P., 114 Maple Ave., Takoma Park, Washington, D. C. 1910.
- Walker, Geo. R., R. F. D. 3, Murray, Utah. 1926.
- Walker, P. Smith, 2127 Cypress St., Vancouver, B. C., Canada. 1929.
- Wanzer, James Olin, 5939 Sherwood Dr., Oakland, Calif. 1922.
- Warmer, Charles A., 412 W. 6th St., Los Angeles, Calif. 1920.
- Warren, Edward R., 1511 Wood Ave., Colorado Springs, Colo. 1909.
- Warrington, Henry, Sutter Creek, Calif. 1927.
- Watson, Dr. S. A., Whittier College, Whittier, Calif. 1929.
- Weber, J. A., 151 Grand Ave., Leonia, N. J. 1915.
- Webster, Frederick S., 555 N. Harvard Blvd., Los Angeles, Calif. 1925.
- Webster, Gwynedd, 1424 Allston Way, Berkeley, Calif. 1929.
- Wegeforth, Dr. Harry M., Zool. Soc. of San Diego, Balboa Park, San Diego, Calif. 1920.
- Weiser, Chas. S., 105 W. Springettsbury Ave., York, Penn. 1920.
- Wendle, Joseph, Bowron Lake, Barkerville, B. C., Canada. 1926.
- Werner, Miss Selma, 2085 Sacramento St., San Francisco, Calif. 1925.
- Wetmore, Dr. Alexander, U.S. National Museum, Washington, D. C. 1909 (1927). [L.]
- Weydemeyer, Winton, Fortine, Montana. 1926.
- Weyl, Edward S., 6506 Lincoln Drive, Mt. Airy, Philadelphia, Penn. 1929.
- White, Ed. F. G., 185 Wurtenburg St., Ottawa, Canada.
- White, Francis B., Concord, N. H. 1926.
- Whitney, Clarence W., 433 California St., San Francisco, Calif. 1927.
- Whittle, Charles L., Peterboro, New Hampshire. 1922.
- Widmann, Berthold, 4621 Wesley Ave., Los Angeles, Calif. 1923.
- Widmann, Otto, 5105 Enright Ave., St. Louis, Missouri. 1904.
- Wilder, H. E., Carlotta, Humboldt County, Calif. 1909.
- Wilder, Melvin D., P. O. Box 642, Santa Cruz, Calif. 1928.
- Willard, B. G., 51 Fresh Pond Parkway, Cambridge, Mass. 1910.
- Willet, George, Los Angeles Museum, Exposition Park, Los Angeles, Calif. 1905.
- Williams, Laidlaw O., 8 Greenholm St., Princeton, N. J. 1925.
- Williams, Robert W., 419 North Calhoun St., Tallahassee, Florida. 1914.
- Wilson, Harold C., Ephraim, Wisconsin. 1927.
- Wilson, Miss Irene M., 247 Stedman Place, Monrovia, Calif. 1929.
- Wilson, W. Warner, Box 128, Davis, Calif. 1929.
- Winson, J. W., Box 642, Sumas, Wash. 1925.
- Wolfe, Capt. L. R., Fort Warren, Cheyenne, Wyo. 1921.
- Wood, Dr. Casey A., Library, McGill Univ., Montreal, Canada. 1916 (1928). [L.]
- Wood, Dr. Clifford H., Glendora, Calif. 1922.
- Wood, George C., Danville, Calif. 1928.
- Wood, Norman A., Museum Zool., Univ. Michigan, Ann Arbor, Mich. 1916.
- Woods, Robert S., Box 356, Azusa, Calif. 1920 (1927). [L.]
- Wright, Curtis, Maplewood Ranch, Calistoga, Calif. 1916 (1922). [L.]
- *Wright, Frank S., 14 Cayuga St., Auburn, N. Y. 1910.
- Wright, George M., 405 American Trust Bldg., Berkeley, Calif. 1927.
- Wright, William S., Nat. Hist. Museum, Balboa Park, San Diego, Calif. 1924.
- Wythe, Miss Margaret W., Museum Vertebrate Zoology, Univ. Calif., Berkeley, Calif. 1912.

Y - Z

- Yeates, E. Woodruff, 3978 Washington St., San Francisco, Calif. 1925.
- Yoder, Wm. H., Jr., 4510 N. Carlisle St., Philadelphia, Penn. 1926.
- Yost, Mrs. Myrtle K., 2831 N. Broadway, Los Angeles, Calif. 1923.
- Youngberg, J. Carlisle, 433 California St., San Francisco, Calif. 1926.
- Zahn, Mrs. Francis M. Harmon, 2115 Estrella Ave., Los Angeles, Calif. 1912.
- Zahn, Otto J., 2115 Estrella Ave., Los Angeles, Calif. 1896.
- Zech, Miss Lillian, 535 W. Highland Ave., Redlands, Calif. 1916.
- Zerlang, Lawrence, 524 W. Hawthorne St., Eureka, Calif. 1918.

